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ABSTRACT

The science career workshop was targeted at freshman and sophomore women enrolled in public and private two- and four-year colleges and universities in the New York City area. The central theme of the workshop was that career choice represents a significant personal decision and needs to be based on sound information about the self, the external world, and their interrelationships. Relying on women scientists as panelists and session leaders, the workshop exposed students to career and lifestyle options and information about the interests, skills, abilities, and background preparation generally required for scientific careers. This report describes the activities that led up to the workshop, the workshop components and participant assessment of them, and the results and recommendations for the future. (Author/BB)

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SCIENCE CAREER WORKSHOP

BARBARA R. HELLER
VICTOR D'LUGIN
LINDA GROSS

Institute for Research and Development in Occupational Education
Center for Advanced Study in Education
The Graduate School and University Center
of the City University of New York

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CASE 33-78
December 1978

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  Ms. Retha Odom, Director of Science/Public Affairs, Shell Oil Company

  Professor Anita Baskind, Career Counselor, Bronx Community College, CUNY

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- Our staff who wrote materials; designed questionnaires, instruments, exercises; duplicated materials and collated them; sent for and reviewed brochures and pamphlets; acted as escorts and monitors during the day; and analyzed the data. We would like to publicly express our gratitude to Ms. Anita Black; Ms. Ellen Gerschitz; Ms. Fran Lischner; Mr. Russell Nutter; Ms. Arlene Vogl; and Mr. Fred Wheeler. Ms. Carolyn Weber prepared this manuscript for publication; and Ms. Rebecca Hayes and Ms. Melanie Bentley assisted.

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Barbara R. Heller

Victor D'Lugin Linda Gross

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IT'S MY LIFE! SCIENCE CAREER WORKSHOP

The Center for Advanced Study in Education (CASE), part of the Graduate School and University Center (GSUC) of the City University of New York, was one of 24 recipients to be awarded a grant from the National Science Foundation[1] for fiscal year 1977 workshop activities to provide women college students with factual information and practical advice so that they may make informed decisions about careers in science.[2]

CASE's one-day Workshop was targeted at freshman and sophomore undergraduates enrolled in public and private two- and four-year colleges and universities in the local New York City area. The central theme of our Workshop, as reflected in its name, was that career choice represents a significant personal decision and thus needs to be based on sound information about the self, the external world, and their interrelationships. Relying on women scientists as panelists and session leaders, Workshop participants would be exposed to career and lifestyle options and information about the interests, skills, abilities, and background preparation generally required for scientific careers.

The all-day program was planned to respond to the priorities of the granting agency and to the common needs of the target population as we perceived them. Thus, the varied activities were designed to provide participants with information about science careers, exposure to professionals in various disciplines, and guided career planning. Despite the high degree of structure, our intent was to personalize scientific careers and describe them realistically and in terms of the skills underlying the diverse tasks professionals perform. The career emphasis was threefold: (1) a person's career, the work she does, is a crucial factor in a total life plan; (2) careers and career decision-making are "trips in progress" that develop as the person matures and as the

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[1] SMI #77-04700, National Science Foundation, Directorate for Science Education, Division of Science Manpower Improvement, Women in Science Program, Science Career Workshops project.

[2] From "Guide for Preparation of Proposals," Closing Date: November 19, 1976. National Science Foundation, Division of Science Manpower Improvement.

external world changes; and (3) people can make decisions in all aspects of their lives--personal and professional--and that they have the right to shape their lives to their own satisfaction.

To accomplish these goals, we organized large group and small group sessions, as well as assigned and open-choice interactive opportunities. Extensive use was made of role models from business and industry on the assumption that, in the normal course of their educational pursuits, college students come into contact with female academicians but could profit from the support (contacts) and input of scientists outside the educational establishment.

The Workshop, IT'S MY LIFE!, was held on December 21, 1977 at the City University of New York's Graduate School and University Center. This report encompasses the activities that led up to the Workshop (including publicity, recruitment, selection and description of the participating students, and the design and strategies employed); a description and participant assessment of the Workshop components; and the results--impact--of the program and recommendations for the future. It was written in anticipation that other people, contemplating or implementing similar programs, could benefit from our experiences.

WORKSHOP PLANNING AND PREPARATION

Early notification of the grant award gave CASE project staff eight months to plan the program, recruit participants, assemble bibliographic and other student materials, and develop forms, flyers, and evaluation instruments. All activities proceeded simultaneously.

After investigating possible dates with the registrars of the 35 campuses from which participants were to be drawn, we chose the Wednesday preceding Christmas for the Workshop. That date seemed to present the least conflict with class, exam, and vacation schedules; it would not discriminate against women who could not attend a Saturday program for religious reasons; and it did not overlap with any other special program at the Graduate School and University Center so that we were assured complete access to all facilities and resources. Invited participants had sufficient advance notice of the date to make individual arrangements and we provided them with letters to their instructors asking

them to consider attendance at the Workshop an "excused absence."

Recruitment

As proposed, approximately 105 freshman and sophomore women college students were to be served. They were to be drawn from the 17 undergraduate colleges of the City University of New York as well as from approximately 18 other local postsecondary institutions.[1] Since past experiences in recruiting for special programs invariably resulted in more subscribers than could be accommodated--leaving us with the somewhat arbitrary decision of whom to accept--we decided to keep publicity low-keyed and make the application process fairly complex. Thus, the process itself became a way to screen to assure participation by women with sufficient interest and perseverance to follow through.

Once an application form was designed,[2] a date set for the Workshop, and publicity materials printed, we sent letters to directors of women's centers, offices of student counseling or career development, and/or deans or science department chairpeople at 35 institutions.[3] Our intent was to have a representative at each campus to support the program and act as liaison with students. In many instances, the original contact responded enthusiastically; in most cases, however, we had to follow a series of referrals. It took from September 14 to 30, including four days of intensive calls, callbacks, and referrals, to locate at least one (and sometimes more than one) person to act in a liaison capacity.[4]

By the beginning of October, the publicity and recruitment materials were sent to the 35 colleges and, in addition, to 13 other colleges who requested them. The materials included 10 to 20 posters (with "tear-off" unstamped postcards students could use to request an application form

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[1]The City University of New York is currently composed of nine senior colleges, eight community colleges, a Graduate School and University Center, and the Mount Sinai School of Medicine (an affiliate institution). AppendixA1 lists the campuses from which applicants were invited.

[2]See AppendixB1 for a copy of the IT'S MY LIFE! four-page application.

[3]See letter dated August 22, 1977 (Appendix A2).

[4]Several people were extremely helpful, suggesting activities and speakers, and making contacts with individual students. We wish to particularly express our appreciation to Ms. E.S., our student liaison.

from CASE) for display on bulletin boards; a sample article suggestive of the type for inclusion in the student newspaper; a brief abstract of the project proposal; and blank application forms.[1] The campus representative was asked to hand-out application forms to students, to have the posters displayed, and to write an article for the student newspaper. We received copies of articles that appeared in several college papers (two such articles are appended)[2], descriptions of the liaisons' contacts with science faculty, and their presentations to student groups.[3]

By the end of October, 96 completed applications (or requests for applications) had been received from students enrolled in approximately 20 different colleges. To stimulate applicants from those colleges not yet represented, a reminder was sent to liaisons; this was effective to the extent that we eventually received at least one application (or inquiry) from students at 54 different college campuses in New York State, New Jersey, and Pennsylvania.[4] Between October 10, 1977 (when the first completed application arrived) and December 20, 1977 (the day preceding the Workshop), we received a total of 240 applications and/or requests from students. Twelve more inquiries were received after December 21, the last of which was dated October 23, 1978.)

Despite the fact that bulletin boards continue to display outdated information (all requests dated after the Workshop were stimulated by "old" posters), they do attract student interest. Analysis of the sources of applicants' requests strongly suggests that, indeed, it is an effective technique: 68.8 percent (or 165) of the 240 students used the postcard (available only as a poster tear-off) to request an application;[5] the remaining requests included eight letters and five calls (for applications), and 62 applications from students who had obtained

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[1] See Appendix A (3, 4, and 5.)

[2] See Appendix A (6 and 7.)

[3] In addition, the Graduate School and University Center's Office of Publications and Community Relations sent news releases to college newspapers and to the Community Calendars of 56 local radio and cable television stations (see Appendix A8). Although we have no accurate count of the total number of stations that used the news release, we were informed that it had been broadcast in late November by most of the FM stations and by at least three local cable TV stations.

[4] In addition, requests to participate in the Workshop were received from students in six New York City high schools, from out-of-school women, from people representing community agencies, and from one unemployed actor.

[5] Moreover, of these 165 women, 116 (70%) returned a completed application.

a form directly from the campus representative (N=44), or to whom an application was sent as a result of a faculty or liaison referral (N=18).

Since we were also interested in the effectiveness of having a liaison on each campus--time-consuming and hence, costly to establish--we examined the number of student inquiries by college. This analysis indicated that at least one inquiry was received from every school with a female liaison, but from only 62 percent of the schools with a male liaison. Moreover, the average number of inquiries from male-liaison colleges was 4.0, as compared with 6.1 from female-liaison colleges. The greatest number of applications was received from the one college at which a student was the designated Workshop representative.

Thus, the minimal use of public media to attract applicants was reflected in a small number of applicants who learned about the program in this manner; and the greater effort that was expended in the design of posters and procedures resulted in a higher payoff. Having a liaison at each college campus was somewhat useful, and in general, female liaisons were more active than males, and non-faculty liaisons (deans, counselors, students) were more active than academic (i.e., science) faculty. For the future, greater consideration might be given to having student representatives.

Student Selection

The procedure we instituted--whereby most interested students first filled out a postcard (stamped and mailed it) and then completed, stamped, and mailed a four-page application--constituted the first round of screening: self selection. One hundred seventy-three people completed it. In the second round of screening, we excluded 52 people, including (two males and) female graduate students, college juniors and seniors, high school students, and women not enrolled in college. That left 121 eligible subscribers.

Invitations were extended to 110 of these women. All met the selection criteria of high level of motivation (as indicated by their interest and perseverance); good educational preparation (evidenced in the number and diversity of completed science and mathematics courses); and better than average potential (as measured by reported grades). The invitations to participate were accepted, but one woman declined[1]

[1] The reason for the one declination was that she would not be in town that day.

in response to a postcard reminder mailed to the 110 women at the end of the first week in December.

In the three working days before the Workshop, a total of 20 women called to cancel. Three cancelled on December 16: two of these "had to attend classes," and one evening student "just started a job and had to work." On the Monday and Tuesday preceding the Wednesday Workshop, 11 women telephoned to cancel: seven had "classes" or "tests," three were "sick," and one woman was working. On the morning of the Workshop (between 6:00 and 7:30 a.m.) six applicants called to notify us they would not attend:[1] one was home with a sick child, three were ill, and two felt the "rain was too bad." Thus, by the time the first participant arrived at 8:15 a.m., we expected, at most, 89 participants; 59 women attended.

Analysis of the stated and suspected reasons for non-attendance[2] suggests that, in addition to classes and final exams, the weather had a significant, negative impact. A severe rainstorm started on December 20, and the forecast was far worse for the next day; everyone experienced difficulty with transportation on the 21st. In retrospect, although a weekend workshop would not conflict with class schedules, in the absence of other information we would again select a weekday. We would, however, hold it in late Fall or early Spring and invite many more above the targeted quota.

Description of Participants[3]

Demographic Background. The 59 participants came from 28 different colleges and universities. Twenty-six participants, approximately 44 percent, were enrolled at the City University of New York--either in

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[1] Some other applicants who did not show up may have tried calling on the 19th, 20th, or 21st, but our phones were uncovered a large part of the time. We were later told by colleagues that our "phones were ringing continuously."

[2] In response to a question on the Followup Survey, 65 percent of 23 women who did not attend but who completed the Survey said they did not come to the Workshop because of an examination or a class. Ten percent said they "overslept," and another 10 percent said they were too sick to go out in the rain.

[3] The information about participants is based on their responses to the Workshop Application. A copy of the Application is appended, see Appendix B1. Since data is available for all 110 invited women, when meaningfully different from that of the participants, comparative data will be presented for the 51 non-attendees.

community college (seven of the eight community colleges were represented) or in a four-year college (there was a total of 15 participants from six of the nine senior colleges). The remaining women were students at 15 other institutions, one community and 14 four-year colleges in New York State, New Jersey, and Pennsylvania. (See Appendix A1 for a list of colleges represented.) Approximately 80 percent of the participants attended a four-year college or university. With the exception of eight women, all were full-time day students at the time.

Two-thirds (40) of the participants were college sophomores, and the remainder freshmen; a larger proportion of invited non-attendees were in their freshman year. As expected, most of the participants were young, recent high school graduates. Most were between the ages of 18 and 21 (58%) and 22 and 30 (15%). There were seven women 31 years old or older, and five participants were younger than 18 years old.[1] Few were married (10%) or divorced-widowed-separated (12%). Most (80%) had no children. When asked what ethnic group they belonged to, 14 percent of the participants did not respond; of those that did, 31 percent were minority group members--black, Oriental, Spanish-surnamed--and 69 percent said they were white.

Educational Background and Plans. Approximately three-quarters of the participants reported an overall high school grade average of "B" or better. Their high school science courses ranged from general science and elementary biology to advanced biology, histology, organic and inorganic chemistry, physics, astrophysics, astronomy, microbiology, nutrition, and physiology.

Twenty-two, the largest number of respondents who had declared a college major (only 70% of the group had done so), said it was (or would be) in biology, and 20 of these women felt that it was "very likely" that they would stay with this major. Others indicated an interest in biology and related fields: one was "very likely" to major in biology or anthropology; another said she was "somewhat likely" to major in biochemistry; and a third would "very likely" major in "liberal arts and biology."[2] Seven women indicated a major, or intent to major, in

[1] A slightly greater proportion (12%) of the 51 non-attendees were younger than 18.

[2] Comparing attendees and non-attendees, twice as many attendees intended to major in the biological sciences. The only other significant difference was that, in general, non-attendees were slightly less certain than participants that they would remain with the major indicated.

psychology (the second most frequently mentioned major), only one of whom felt it was "highly unlikely" that she would. There were four participants with a chemistry major; two with a major in engineering (one chemical, one electrical); and two physics majors. Five women responded with "a major in science"; one with"mathematics or science"; and one indicated an intent to major in mathematics. Each of 10 participants indicated the following majors: geography, anthropology, geology, nutrition, pharmacy, nursing, physician's assistant, community mental health, rehabilitation therapy, and occupational therapy.

Approximately 75 percent of the participants had not yet declared a college minor. In response to the question "What is/will be your minor?", the largest number of respondents said psychology (8); three would minor in chemistry, three in English, and three in mathematics. The remaining respondents indicated a wide range of subjects, including poetry, medieval French literature, biology, computer science, and sociology.

The most frequent career choice was medicine. When they completed all schooling, a total of 12 participants said they wanted to be a physician (8),[1] psychiatrist (1), or plastic surgeon (1), or sports medicine (1) or forensic medicine (1). Ten mentioned careers related to medicine, including dentistry (1), physician's assistant (1), genetic counselor (1), nurse (2), medical lab technician (2), and medical and drug research (3). The second most frequently mentioned career cluster was psychology (8 [including three women interested in doing animal behavior research]) and related fields such as counseling (3), occupational therapy (2), and speech pathology (1). Three women wanted to be biomedical engineers; others listed science teacher (3), biomedical researcher (2), scientist (2), physicist (1), ecologist (1), and anthropologist (1), optometrist (1), lawyer (1), biologist (2), hard rock geologist (1), computer programmer (1), and engineering management (1). Seven women were "not sure," but three of them said "something to do with science."

When asked "how likely do you think it is that you will actually enter this field?", 63 percent of the participants felt it was "very

[1]The numbers in parentheses refer to the number of responses, not respondents; several women listed more than one career.

likely," 24 percent indicated it was "somewhat likely", and only one woman said it was "highly unlikely" that she would achieve her career goal. We asked applicants about their educational plans, specifically what was the highest level of education they intended to attain and how many years they would need to achieve that degree. We were also interested in whether they anticipated continuity in schooling, and, if not, to describe the nature of the interruptions.

Table 1 summarizes applicants' responses to the question about highest level of education. This question, in similar but not identical form, was asked on the application (column 1), at the end of the Workshop (column 2), and again at the time of the Followup Survey (May 1978). (column 3).[1]

Table 1

Proportion of Participants and Non-Attendees Planning to Attain College and/or Advanced Degrees
(Figures in Percentages)

Highest Degree Intended	Application Form		Workshop Evaluation	Followup Survey	
	Participants	Non-Attendees	Participants	Participants	Non-Attendees
	(N=59)	(N=51)	(N=56)	(N=29)	(N=22)
Bachelor's	11.9	15.7	1.8	10.3	13.6
Master's	33.9	39.2	17.9	13.8	45.5
Doctorate	33.9	31.4	57.1	44.9	18.2
M.D.; D.D.S.; LL.B.	11.8	7.8	3.6	31.0	22.7
Ph.D. + Professional degree	1.7	0	19.6[a]	-	-
Other (including non-specified)	6.8	5.9	0	0	0
	100.0%	100.0%	100.0%	100.0%	100.0%

[a]The large percentage of responses in this category includes some proportion of the original M.D.'s as well as"non-specified others".

Examining the initial responses (on the application), it is apparent that all applicants can be characterized by high educational aspirations.

[1]Changes in the amount of desired education, from that indicated on the application through that noted on the follow-up questionnaire, will be discussed in a later section of the report. See pp. 50-53.

A minority, approximately 12 percent of the participants and 16 percent of the non-attendees, intended to complete their education with a bachelor's degree. The overwhelming proportion anticipated a more advanced degree--a doctorate, a professional degree (e.g., M.D., D.D.S.), or both.

Approximately one-quarter (22%) of the participants indicated they would finish their education in less than four more years. Most (69.5%)percent, felt that it would take between four and eight years based on their current plans, and a few said it will take more than eight years to achieve their educational goals. Eight out of ten participants planned to finish their education without interruption. Of the 12 women who indicated that they would probably interrupt their education, 11 gave a work-related reason (for economic necessity and/or experience) and one planned to "get married to her fiance in five years."

Thus, at the time of the Workshop, participants had high educational goals, a fairly realistic understanding of how long it takes to achieve them, and tended to be somewhat optimistic about continuing their schooling without interruption.

Participants' Interest in Science.[1] A question on the application asked when and how the applicant first became interested in science or scientific careers. Of the 52 participant respondents, 26 said they had "always" been interested in science: "for as long as I can remember," or since "I was very, very young," "since childhood," or "since I was four (or) five." Thus, half the group indicated an interest stemming from pre-school days. Eleven participants said their interest started in grammar or junior high school (the seventh grade was singled out), and 14 women said their interest was piqued in high school (12) or college (2). Three respondents (more mature women, 30 years old or older) said their interest in science was "fairly recent."

When interest began in the preschool years, it was generally because of a fascination with how things/organisms worked/functioned. A few women remembered a special event (such as a trip to the seashore or planetarium, or a visit to a hospital emergency room), and a small number said their early interest was stimulated by a relative--usually

[1]Unless otherwise noted, there were no significant differences between attendees and non-attendees.

a parent. Those who became interested in science during their school years usually attributed their interest to participation in a special program (e.g., a science fair in grammar or junior high school, a seminar sponsored by the Society of Women Engineers or the Junior Academy of Science); to their first science course (typical comments suggested that they did well in these courses); and/or to experiences as volunteers in hospitals, nursing homes, and so on. One participant became interested in science through reading science fiction.

Participants' interest in science was reflected to some extent in their hobbies, but more so in the clubs and groups to which they belonged and the organizations and agencies for which they worked. They reported that they were active in sports (swimming, tennis, jogging, camping, hiking, and karate); enjoyed movies, theater, museums, ballet, and literature; wrote; sang, and played musical instruments; and painted, sculpted, and so on. One participant said she "liked to play with her chemistry set"; another "repaired bikes and did plumbing." There was also a plant terrarium maker, two puzzle fans, and one young woman who "makes model rockets."

As a group they are active in school clubs and organizations--they belong to or are officers of student governments, and are members of the math team, biology club, Spanish club, French club, theater club, ecology club, geology club, astronomy club, English club, nurses' club, and anthropology club. They work on the school paper, magazine, and yearbook; on poster committees; for scholarship fairs; as an "engineer for the college radio station"; and as the school's computer programmer.

Outside of school their activities tend to be of three kinds: they are members of science groups, such as the Academy of Science, National Geographic, Smithsonian, and New York Academy of Science; they are active in neighborhood and block associations, community centers; participate in feminist groups and consciousness-raising groups; they volunteer in ambulance corps, the Red Cross, Girl Scouts, 4-H Clubs, and Candy Stripers and work in nursing homes, and with disabled children and senior citizens.

Participants' Personal Experiences. Since we were interested in early influences and the effects of early experience on career choice,

we asked applicants if they knew anyone in a scientific profession and, if so, how that person influenced their career choice. We also asked them to rate how supportive "important others" would be if they entered a scientific career.[1]

Approximately one-third (19) participants said they did not know anyone working (or who had worked) in a scientific field. Forty women said they did (indicating males and females in approximately equal numbers) and most frequently mentioned relatives (including cousins, uncles, aunts, parents, and a brother) and teachers. Their comments are interesting. One attendee said she was influenced by a "[male] who told me that you can't get through a day without physics or mathematics." Several spoke about admiring the person's work, skills, enthusiasm, motivation, and enjoyment; others said they had received confidence, encouragement, or "moral support," and were "treated as an equal." One young woman felt that books by a female author (unspecified) had had a great influence on her own choice of a scientific career.

Table 2 summarizes participants' ratings of how supportive various people would be if they opted for a career in science. As can be seen

Table 2

Participant Rating of the Extent of Support
They Expect From Others

Various "Others"	N[a]	Very Supportive	Somewhat Supportive	Neutral	Not Supportive	Average Rating[b]
Mother	55	74.5%	16.4%	5.5%	3.6%	1.38
Father	50	60.0	18.0	18.0	4.0	1.66
Siblings	46	60.8	19.6	19.6	0	1.58
Boy Friend(s)/ Husbands	42	66.7	21.4	9.5	2.4	1.48
School Counselors	41	87.8	4.9	7.3	0	1.20
Girl Friend(s)	50	76.0	18.0	6.0	0	1.30

[a] N = Number responding to the question.

[b] 1.0= very supportive; 4.0= not supportive.

[1] Questions 11 and 12, respectively, on the application.

in the table, more participants rated counselors as being very supportive than other groups of people, and fewest felt that fathers and siblings would be as supportive. Looking at the average rating (the extreme right-hand column in Table 2), lends confirmation to their feelings that counselors would be the most supportive,[1] followed(in order) by girl friends, mothers, boy friends/husbands, siblings, and fathers. These data seem to suggest that women perceive other women as being more supportive of them than are men, and that mothers are perceived to be a positive factor and fathers a more negative one in encouraging women to pursue non-traditional, high level careers.

Table 3 presents applicants' responses to Question 24 (one of several optional questions) which asked them to check the highest level of education their mothers and fathers attained. Parents' educational

Table 3

Level of Parental Education
(Figures in Percentages)

Highest Educational Level	Mother's Education		Father's Education	
	Participants	Non-Attendees	Participants	Non-Attendees
Grade school or less	5.1	6.0	5.1	6.0
Some high school	13.6	12.0	13.6	10.0
High school graduate	23.7	36.0	17.0	32.0
Some college	17.0	20.0	6.8	20.0
Bachelor's degree +	15.2	12.0	23.7	16.0
Master's degree	11.9	6.0	13.5	0
Doctorate +	3.4	2.0	3.4	10.0
Professional degree	0	0	1.7	0
Other (includes technical school training)	1.7	4.0	1.7	0
No Response	8.4	2.0	13.5	6.0
	100.0%	100.0%	100.0%	100.0%

[1] Most school counselors are female.

achievements tend to be high, with approximately half the parents having attained at least a high school diploma. A somewhat larger proportion of parents of participants continued their education beyond high school graduation as compared to parents of applicants who withdrew. This holds true both for the mothers (49% of whom had continued their education) and fathers (approximately 51%); comparable percentages for the parents of nonattendees are 44 percent and 46 percent, respectively.

Most parents had been or were working: all the fathers of the nonattendees had worked, and 98 percent of the fathers of the attendees had had work experience. Interestingly, there was a larger difference in the proportion of working mothers: approximately 10 percent of the mothers of the nonattendees had never been employed, as contrasted with 5 percent of the mothers of participants. There was also a small difference in the proportion of mothers who were employed in scientific--including research and university (and teaching)--careers. Approximately 16 percent of the mothers of participants and 12 percent of the mothers of non-attendees were employed in a scientific occupation. The proportion of fathers in these careers was the same.

Participants' Expectations. The Workshop application form included two questions[1] that, in addition to providing information requested by the National Science Foundation, were used to plan the Workshop program.

With the exception of two applicants, all others responded to these questions giving at least one, and in most instances, several reasons. The reasons ranged from the very general--"I want to learn about something new"--to the more specific "I want to find out about research possibilities in the health field..."; from the lofty "I want to clarify my goals," and "to find out about the problems women face," to the more mundane "My teacher recommended it." The most frequently advanced reason was to find out about job opportunities open to women in science: this was stated by 36 percent of the participants and 20 percent of the applicants who did not attend. The next most frequent reason was to speak to women working in or interested in science; the "other women" included professionals as well as peers. Approximately 20 percent of the participants and 15 percent of the nonattendees were very interested

[1] Questions 18 and 19, "Why are you applying for participation...?" and "What do you hope to gain from this Workshop?", respectively.

in talking to other women, although it was not clear what they wanted discussed. Equally important was the need for guidance about their own career choices. This was expressed in terms of "choosing a specific area to pursue," "deciding on a career," "to receive guidance," or "to decide whether or not to choose a science career." Several applicants said they were applying to find out about courses and other educational requirements.

When the question was worded in terms of what they hoped to gain, the most frequent response was "to find out about job opportunities for women." The responses to this question paralleled the responses to Question 18: learning how to choose a career or obtaining guidance in making a decision; increasing self-understanding; meeting other women with similar concerns; obtaining information about the sciences, the required courses, salaries, financial aid, and so on.

At the time of planning the Workshop we could not differentiate between applicants who would attend and those who would not. We therefore approached the design of the Workshop guided by the variation in age of the applicants, motivation and past achievements, background characteristics, clarity of career goals, and--more importantly--what they expected from the experience. While these factors significantly overlapped the project's proposed objectives, from a content point of view, we attempted to allow for the diversity of individual differences.

Guest Scientists and Other Group Leaders

Key to the successful implementation of the Workshop were guest scientists with sufficiently broad expertise in many fields and at different levels; skill to conduct small-group sessions; interests and experiences that matched, to some extent, those of participants; and varied backgrounds, lifestyles, and ages and ethnicities. To obtain seven presenters we invited 11 women.

During the four months (August-November) that we spent recruiting guests, we contacted and were contacted by many people with suggestions and recommendations. We spoke with several executive officers of the GSUC doctoral programs who provided leads to recent graduates; with the

Director of the GSUC's Center for the Study of Women and Sex Roles; and with professors from many departments on many CUNY senior college campuses. At least three women volunteered their services, but did not meet our criterion of employment outside a university system.

Selection and Description of the Guest Scientists. We contacted the National Science Foundation's "Visiting Women Scientists Program " and were directed to two people, one of whom forwarded our request to the American Chemical Society which, in turn, gave us the names of several chemists. The first woman we spoke with accepted our invitation. A polymer chemist, she is a divorced mother of two children who obtained her doctoral degree 27 years after she was graduated from college.[1] In high school she wanted to be a medical technologist; in college she enrolled in a pre-med program, graduating with a bachelor's degree in chemistry. After college she worked as a biochemist; helped with her husband's graduate school tuition; and during her children's young years, was active in political and community causes, holding public office. In 1972 she was awarded a Ph.D. in Polymer Science and Engineering. Currently, she works full-time for Eastman Kodak Research Laboratories.

A biologist was more difficult to recruit. On the recommendation of the President of the GSUC, we contacted a biologist at Mt. Sinai Hospital (CUNY) who, unable to fit our Workshop into her schedule, suggested three women, two of whom we could not locate. The third, a Fellow in the Hospital's Department of Pharmacology, accepted our invitation, after meeting with us and discussing the program.

Our biomedical scientist (pharmacologist) was a very young, recent Ph.D., who at the time of the Workshop held a post-doctoral fellowship. She has done research in neurochemistry, brain function and learning, and the effects of drugs on pregnancy. Her earliest interest was experimental psychology. In college she majored in history and science. After obtaining her degree, she worked as a lab technician in the pharmaceutical industry, then at a psychopharmacology lab at a medical school. During that time she married and, in order to enter a graduate program in pharmacology, took four terms of chemistry in one summer.

[1]Her autobiography, and those of the six other scientists, were included in the participants' materials.

Her daughter was born at the end of graduate school. As a result of concern for her child's emotional growth, she has made some temporary compromises in her career plans.

The fourth woman we invited to participate--and the third to accept--is a Curator of Animal Behavior at the American Museum of Natural History who we met, by chance, at lunch. A world-renowned comparative psychologist, she started college interested in a teaching career. Currently widowed, she married in college and, as an undergraduate, had four majors. She was graduated with a major in psychology and experience in animal research and obtained her Ph.D. in comparative and physiological psychology in reaction to what she describes as the unscientific basis underlying much of Freudian psychology and psychiatry.

In addition to her research on the evolution of social and emotional behavior, she teaches, lectures, and writes extensively. Her commitment to the Workshop goals was evidenced in numerous ways: in recommendations of other women scientists (or leads to them), in alerting us to relevant materials and programs, and in encouragement--her vitality was also very appealing to participants.

We obtained a Hispanic (Cuban) engineer from the New York Telephone Company's Office of Public Relations. A young, divorced mother, she has worked for the phone company in one or another capacity since she was graduated from college with a B.S. degree in Metallurgical Engineering. Unlike the other guests, she became interested in engineering when she was 14 years old, just one year before she came to this country. She entered college, starting out as an aerospace engineer. During college she married, and before graduation had a child. She has spent her professional career with one company, now working as a project manager, systems analyst, and programmer. Officially she is an "assistant engineer-mechanization." Although she attributes her "meteoric career" in part to her young age and her minority status, she is ambitious, well-liked, and has serious aspirations to become more proficient in computer system development.

As each scientist accepted our invitation, we examined and reexamined the group to maintain a balanced panel of women. We included a medical doctor since such a large percentage of applicants were interested in a medical career. Our search for a physician--preferably a minority

group member with experience in hospital administration, private practice, research, and an interest/involvement in community affairs--was a long one.

Our first contact was with a neurologist on the staff of Columbia Presbyterian Hospital. She was not available on December 21 and, in turn, she recommended a pediatrician who was involved in research in developmental disabilities. After meeting together we agreed she did not meet our criteria. She was extremely helpful in providing further leads. We contacted the Chief of Pediatrics at St. Luke's Hospital Center who could devote a morning, but not a full day, to the Workshop. She suggested we contact the Head of Pediatric Rehabilitation at Harlem Hospital who was available and very interested in participating.

She is a West Indian who came to this country after high school and completed her medical degree in 1949. When she was five years old she decided to become a physician against the wishes of her father (a physician), but with the support of both parents. Her undergraduate career in a pre-med college program was difficult, as was medical school where she was the only black. During a Fellowship in pediatric cardiology she married and had the first of four children. The 10 years following were devoted to private practice, where she developed specialties in asthma and cerebral palsy. She gave up her practice for a Fellowship in Rehabilitative Medicine and was subsequently offered a position at Harlem Hospital where she is involved with community medicine and with victims of child abuse and neglect.

The sixth scientist had a doctorate (1978) in computer science, and a background in mathematics. She was born in Hungary and came to the United States when she was 12 years old. She spoke no English. She was graduated from the Bronx High School of Science and, during college, majored in mathematics. She married after her freshman year. After graduation she joined IBM's Research Center where she has continued to work full-time. She obtained a master's degree in math as an evening student and had her first child ten days before graduation. She then left school, but continued working full-time until her second child was two years old when she also went back to school on a part-time basis for a doctorate in computer science. She has been at IBM for her entire professional career, first as a specialist in computer graphics

and then as a systems analyst working on advanced communications systems. She is now at IBM's corporate headquarters. We met her when she appeared as the keynote speaker for CASE's "Enhancing Potential for Women in Science."

The seventh and final panelist proved to be the most difficult to select, primarily because we wanted a scientist with expertise in the environmental and social sciences. We eventually located a young woman who had a Doctorate in Public Health with a major in Anthropology and who was working as Director of Nursing at a neurological institute. She could not participate because the Workshop conflicted with family vacation plans.

At the end of November we were still seeking a woman with similar credentials. With the help of the computer scientist we located a woman with undergraduate training in chemistry and English and a masters and doctorate in Environmental Health. A new doctorate, she was in the process of looking for a job in the geographic area so that she could be near her husband. She started her graduate degree as a chemistry major; after one semester of organic chemistry she left school and went to work as part of a multi-disciplinary team working on environmental problems. She returned to graduate school after two years for a degree in environmental health. During her third year she married. She characterizes herself as the classic example of someone who didn't know exactly what she wanted to do until, quite by chance, she found an exciting, appealing job.

The seven scientists who would bear primary responsibility for the Workshop varied in age (from the late 20's to the late 50's) and background. Four were foreign-born, three of whom came to this country at about high school age. The group represented various religions and included one Hispanic and one black woman. All had been married, and at fairly young ages, and at the time of the Workshop two were widowed and two divorced. One woman was childless, and another was considering children as a possibility.

The educational history of four of the guests was discontinuous. Most took short breaks, either for family reasons and/or to gain some practical experience; one's education was interrupted for more than two decades. All had obtained a doctorate or the most advanced degree required in their specialty. Three had made an early career commitment

and had worked toward fulfilling it without significant deviation. The others had been less certain about their careers and had changed major several times. All, apparently, were happy with the work they had chosen.

For the most part, these women had successfully managed to integrate their personal and professional responsibilities in some manner and all indicated that they planned to continue in their professions. Interestingly, for many the direction their work would take in the future would change, reflecting personal growth and positive external social pressure.

Preparation of Presenters. Since it was not possible to bring the seven women together as a group before the Workshop, training proceeded by telephone and, with five of the women, in one-to-one meetings. The scientists were asked to do several things, including writing an up-to-date vita, and autobiographical sketch, a description of a "typical day at work" that focused on skills, and an analysis of the skills and activities they engaged in as well as those that typified work performed by other people with different (i.e., usually lesser) academic qualifications.[1] Most of the women thanked us for "making me update my vita--it really needed to be," or for "helping me take a retrospective look at my career."

For the most part the scientists felt able to cope with their panel and small-group responsibilities that were well-detailed. Those that were hesitant were concerned with keeping the groups "moving " and endorsed our suggestion of a leader-in-reserve. We proceeded to select mini-group leaders with this leader-in-reserve function in mind.

Mini-Group Leaders. We designed the Workshop so that in one of the sessions (Session III) participants could choose an activity they wanted. (In the other sessions, the activities and assignments were set in advance.) The purpose of this choice session was to increase the likelihood that all participants would come away from the Workshop satisfied in whole or in part. Therefore, in addition to having expertise in the content areas that we could anticipate participants wanting to know about, the leaders of Session III activities had to be experienced counselors, able to deal with students on a one-to-one basis, and familiar with group processes to facilitate (if need be) the other sessions led by scientists.

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[1] These materials, in edited form, were an integral part of the Workshop content and were included in the materials for participants.

We invited a CUNY community college counselor with whom we had worked previously to organize activities for participants who wanted to define their work values and personal goals. Called "Career Choice: Select, Don't Settle...", this group focused on the needs of those who were undecided, or otherwise concerned about their future. The second mini-group was led by the Director of Admissions at a second CUNY community college. "It's Not What You Take, but When and How You Take It...", offered participants practical advice about educational requirements for admission to graduate school.

The third small group activity, "Ask the Computer...", was conducted by the project associate for students who wanted to get on-line to a computer system that would permit them to explore banks of college and career information in terms of their own requirements. (In addition to the computer, other resource materials were available.)

"Corporate Need and Science Talent..." was the name of the fourth small-group activity designed by the Director of Science Public Affairs at Shell Oil Company. Participants who attended this mini-group discussed how to apply for a job in industry, what to expect from a first job, opportunities in business for people with training in the sciences, and tuition reimbursement options.

The four mini-group leaders were also assigned to other sessions for the express purpose of providing back-up resource. With one exception, this was effective. In the one instance where it was not, it was largely due to a misunderstanding of roles between the scientist and the mini-group leader.

Workshop Design and Materials

The final plan for the Workshop was the result of extensive deliberation, consultation, and compromise with logistical problems. Holding the Workshop at the Graduate School and University Center on a weekday was our first decision; alternatives included the use of a college campus or a hotel that had meeting facilities. Lack of funds for opening the Graduate School and University Center precluded a Saturday or Sunday workshop, as well as an hotel; this coupled with the availability of food, maintenance, and audio-visual services at the Graduate School and University Center--and other criteria--led us to the specific weekday date we selected.

The Graduate School and University Center is centrally located in mid-Manhattan. It houses all the University's doctoral level programs--

except for some laboratories--and many special institutes, centers, and programs. It has facilities for producing and viewing films; feeding faculty, students, conference attendees, and the public; large and small meeting rooms; and several auditoriums. To accomodate the Workshop, we reserved an auditorium for 150 people, a room for [illegible] buffet lunch, and seven seminar rooms. Unfortunately, these rooms were on different floors of the building; and the physical transport of participants, staff, guests, and materials became a major consideration on a day that classes were held.

As we began to detail plans it became apparent that we could not fulfill all content objectives nor use optimal strategies given the parameters of space and the length of the Workshop day. Six to seven hours of session time meant decisions about small and whole group activity and about written and interactive emphases. The balance we reached was to use relatively less Workshop time presenting information that we believed could be as effectively presented in written form ; to place greater emphasis on the type of information that we felt could best be obtained through personal interactions--i.e., the experience of the guest presenters--and to supplement this with materials for participants to take home.[1]

Workshop Schedule. The Workshop was divided into seven parts: Registration, Session I, lunch, Session IIa, Session IIb, Session III, and Session IV.

Registration was scheduled for half an hour, from 8:45 to 9:15 a.m. During this time, participants were given materials and were asked to complete two exercises (the "pie" and the Life Line[2]) that were designed to provide baseline data about the women and to stimulate them to think about their values, interests, and plans in relation to their long-range goals. (These exercises were repeated in Session IV.)

Session I lasted 2½ hours. Meeting as a group in the large auditorium, participants were formally welcomed by the Dean of Graduate Academic Programs. Following that, there was a panel presentation by the

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[1]See Workshop materials, "All You Ever Wanted to Know About Science Careers, or, Where Else to Ask " ; and "A Guide to Self-Directed Career Planning."

[2]See Appendix B2 and B3.

scientists in which they described their careers and personal life histories. The focus was on the common decisions that professional women face and how these might be resolved. The goal for student participants was to try to visualize themselves as scientists and to visualize the scientists as college freshmen and sophomores.

A buffet lunch took place between the hours of noon and 1:00 p.m. The students, guest presenters, and staff sat together. The atmosphere was informal and the participants were comfortable in addressing questions to the scientists. The lunch break was also used to tell the participants about the events scheduled for the remainder of the day, particularly the assigned and choice options.

Session IIa, one hour long, followed lunch. The format of this session, and that of Session IIb, were similar. Each participant was assigned to a small group led by a scientist assisted by a mini-group leader. Student assignments were made by project staff on the basis of students' interests and goals, as indicated on their application. We attempted to place each participant in two small groups, each led by a different scientist and composed of somewhat different peer participants. Usually, they met first in the highest interest group. As an illustration: a student interested in "psychology" met first with the comparative psychologist in Session IIa and the computer specialist in Session IIb--or, vice versa. The seven small seminar rooms were used for Sessions IIa (from 1:00 to 2:00 p.m.) and Session IIb (from 2:00 to 3:00 p.m.).

Entitled, "A Typical Day in the Life of a [Comparative Psychologist; Computer Specialist; etc..."], the intent of these sessions was to provide participants with specific information about the sciences. By asking the scientist to speak about the kind of work she does, the variety of tasks her job entails, the type of environment in which she works, and her relationship to other workers, participants would be exposed to career information that is not available in other ways. Participants were expected to come away from these sessions with a better understanding of the diversity of skills and aptitudes involved in a scientific career; the different kinds of opportunities that exist and the different kinds of places in which scientists may work; and the responsibilities of people with different levels of schooling.

During Session III (from approximately 3:00 to 4:00 p.m.), participants were given the choice of continuing discussion with their Session IIa and IIb scientists; meeting one or another of the scientists; or attending one of the four mini-group activity sessions. The goal of Session III, "It's My Option", was to enable the students to obtain more information about themselves and/or about the requirements of the external world. They were encouraged to meet with people they had not yet met and to make their selection on the basis of their personal needs for information.

Session IV reconvened all participants and guests in the auditorium. Lasting approximately from 4:00 to 4:45 p.m. (many participants stayed until 5:30 p.m.), this session was led by the project director and the career counselor. An attempt was made to tie-up loose ends and put the Workshop into perspective; present participants with clear suggestions of "Next Steps"--things they might consider doing after the Workshop; distribute and explain the take-home materials[1]; and obtain student reactions to and evaluations of the Workshop.[2]

Workshop Materials. All materials[3] were developed by project staff and were of two types: those for use during the Workshop; and those for use after the Workshop. All participant materials were color-coded. Anything suggested for use during the day was printed in red type; other materials in black types. Selected exercises, designed to be used during the day for a dual purpose, were printed in red type on white and yellow NCR sets. The yellow carbon was collected and used by project staff to evaluate the Workshop; students retained the white copy. At Registration we distributed a packet of materials to each participant. All materials were divided into sections corresponding to the session outlines.

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[1]The take-home materials included the "Guide to Self-Directed Career Planning"--the descriptive materials about the sciences; All You Ever Wanted To Know About..., prepared by project staff; brochures obtained from professional associations; as well as a puzzle from the Bell System and a pamphlet from Shell Oil Company--both of the latter items presented by the guest speakers.

[2]Students were asked to complete a pie and Life Line exercise and the Workshop Rating Form.

[3]This does not, of course, include folders, name tags, pencils, pads, or signs, nor the tape recorders, film projectors, public address systems, and other audio-visual aids and displays provided by the GSUC.

The Registration packet contained: "General Information for Participants", which included an explanation of the coding system (used on any forms we collected) to assure anonymity and protect confidentiality of responses. In addition, there was a carboned set of It's My Life! (the pie exercise, Activity I-#1); the Life Line exercise (Activity I-#2), and a fact sheet "Women in Science: Did You Know That...?"

The Session I packet contained a description of the Workshop goals and of the participants,"Women in Science Careers Workshop, Background and Goals"; a fact sheet entitled, "Women in the World of Work: Did You Know That...?"; abbreviated vitae and autobiographies of the seven guest scientists; and Activity I-#3, It's Their Life! (This activity exercise was for participants' own use in focusing on the differences and similarities among the panelists.)

Session IIa and IIb packets were individually collated for each participant on the basis of the groups to which they were assigned. Between the two packets, however, each participant received a complete set of materials which consisted of the following: a copy of "A Typical Day in the Life of [each of the seven scientists.]"; blank copies of Activity II-#1 for analyzing a typical day; the scientists' "Self-Analysis of the Importance of Different Tasks, Activities, and Working Conditions in My Job, and in the Jobs of Others in My Field"; and blank copies of Activity II-#2 for analyzing the skills, aptitudes, and abilities scientists use in a typical day at work.

For Session III, each participant received a "Directory of Mini-Groups." This included room numbers; a brief description of each of the mini-groups and an introduction of the mini-group leaders; and a "GIS Computer Information Request Form" to be used in the computer mini-group or submitted to us after the Workshop.

Most of the materials for Session IV were evaluative in intent. We included and collected another NCR set of It's My Life! (the pie exercise); Life Line; and the Workshop Rating Form. Participants also received a worksheet ("Next Steps ..."), and a "Thank You..." from the project staff.

The Workshop materials described above were intended to further the specific objectives of each session. Thus, for example, the Session II materials and activities were designed to help participants analyze careers in ways that highlighted the diversity of day-to-day activities,

the various skills made use of in performing a job, and the relationship between one's work and one's life.

The take-home materials were largely informational; most were written by project staff to supplement material that was not available elsewhere. Initially, we intended to provide participants with pamphlets, brochures, and other resources published and distributed at no charge by professional and trade organizations. From the Occupational Outlook Handbook and the "Guidance Information System"[1] we obtained the addresses of 47 scientific associations from whom we requested multiple copies of career literature. A total of 38 organizations responded, five of whom sent 125 copies of their materials; most others had materials available for from 10 to 25 cents a copy.

We also wrote to the women's caucus of 42 scientific-professional associations. Three sent us materials. All together, we obtained sufficient copies of seven career booklets to distribute to every participant. Beginning in October, staff wrote six sets of materials covering careers in engineering; physical science; psychology; environmental science; life science; and health, medicine, and dentistry. As sources we relied on the Dictionary of Occupational Titles (Third edition, 1965), the Occupational Outlook Handbook (1977 edition), and other miscellaneous materials. As we will describe in the evaluation, these materials were regarded by participants as one of our most valuable efforts.

Each participant also received"A Guide to Self-Directed Career Planning"that was specially published for them. This Guide directs users through a sequential series of exercises, starting with ones designed to increase their awareness of their personal and work values and preferences. One chapter is devoted to techniques for gathering information about the world of work. The final section takes the user through decision-making stages (including setting goals, listing conflicts, reviewing alternatives, and examining the advantages and disadvantages of resolutions) to arrive at a long- and shorter-range career plan.

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[1]"Guidance Information System", Time Share, Inc., an affiliate of Houghton Mifflin

IT'S MY LIFE! WORKSHOP

This chapter briefly discusses the conduct of and reactions to the one-day workshop. Its detail, unusual in final reports, is purposeful: we have attempted to convey all our experiences in anticipation that we can communicate what we learned in setting up this project, so that they can profit by our findings in duplicating our Workshop or implementing a similar one at other sites.

In the weeks preceding December 21, 1977 we met with the Graduate School and University Center's representatives for room assignments, audio-visual resources, buildings and grounds, and food services to confirm arrangements. Our food requirements, including morning coffee, were complex: Kosher meals and special health-related diets were requested by several applicants. Although we were able to accomodate most requests, in two instances we could not. We asked these women to bring their own food and reimbursed them at the per capita costs of the lunch we contracted for.

On the day before the Workshop we made staff assignments: two people at the registration table; two to greet and register guests and drop-ins[1]; two others to help students with Activity I-#1 and I-#2; and one person in the auditorium's projection booth. As the Workshop progressed, these assignments changed: rooms to be used in later sessions were checked; other staff were designated to escort the groups from session to session. After lunch, a headquarters was set up on one floor and staff assigned to sit in on the small group sessions[2], or to be available in case (s)he was needed. One person stayed in the auditorium to watch the personal belongings and to record early leavers and late arrivers. At 3:00, the entire staff started transporting the take-home materials to the auditorium. Everyone was available to distribute these

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[1] We had one student drop-in (i.e., a student who had not completed the application process), and ten guests (including two from the National Science Foundation).

[2] Great pains were taken to explain to staff, most of whom were CUNY graduate students, that their role was merely one of observer; in no instance were they to participate in the session. According to feedback from the guest scientists, our staff took these instructions seriously. Unfortunately, the same could not be said about outside observers who frequently assumed active roles.

materials[1], collect evaluations, thank and say good-bye to participants.

Since the Graduate School and University Center is host to many special events, it was not possible to get access to the rooms in advance of the scheduled day. Project staff arrived before 7:00 a.m. to take care of last-minute details. By 8:00 a.m. we were joined by five other members of CASE, leaving no one in the office to cover the phones. Any cancellations that were phoned in that morning as a result of the inclement weather were, at best, haphazardly recorded. We missed calls from two of the scientists who tried to let us know that they would be delayed because of the rainstorm.

Before the first participant arrived, we displayed signs and posters inside and outside the building; arranged the dais for the panelists, prepared areas for registration, attendance, and coffee; and set up coat racks and umbrella stands.[2]

We worked very hard on organization, but it proved worthwhile. The scientists, guests from other institutions and agencies, and the participants recognized and appreciated the orderliness of events. One presenter wrote "I just want to share my enthusiasm in telling you of the 'smashing' success. It was better than a Broadway opening. I personally enjoyed spending the day with you all and found it most productive. Thank you for the opportunity of letting me share this day with you. Looking forward to future workshops together... "

A guest told us that "It was one of the best organized, most informative, and inspiring conferences I ever had the pleasure of attending. I was most impressed with the materials that were developed for this occasion." And another wrote a lengthy personal letter to the project director which included the following paragraph: "Your workshop was superbly organized and conducted without transmitting any anxiety (if you felt it). I think the materials you gave to the students will be valuable to them; it will give them a ready source of information for questions that will arise after they return to their schools."

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[1] The complete set of participant material weighed 2 lbs., 14 oz. The Dime Savings Bank of New York and the Dry Dock Savings Bank donated shopping bags in which participants carried home their materials.

[2] In addition, as a back-up in case the morning session ran for a shorter period of time than we had scheduled, we had ready a 20-minute film from the Bell System (New York Telephone Company) called "A World for Women in Engineering." This film was not needed, but if necessary would have been an excellent stimulus for group discussion.

Students' reactions were especially meaningful to us in that they revealed that participants are aware of the effort that goes into planning. They told us that: "Everything was planned beautifully... everyone was nice and helpful!"; "The day was handled nicely"; "It was excellent in terms of organization..."; "Very impressive"; and, "I was very impressed with how well organized it was."

Session I

The first participant arrived at 8:15, the last at 10:00 a.m. One woman came at 1:00 for the afternoon session because she took a final exam in the morning.

Session I started with a welcome to participants, during which the projectdirector (who acted as moderator) explained the day's objectives, and introduced the keynote speaker--CUNY's Dean of Graduate Academic Programs, the Graduate School and Unveristy Center's highest ranking dean. Following her address, the moderator introduced the first two scientists. Rather than have the seven scientists speak consecutively, with only a brief introduction as a transition, the plan we followed was to present them in pairs so that they could react to one another and call attention to their similarities and differences.

The first two speakers had in common the fact that their education was discontinuous as they left school in order to define and redefine their interests. Moreover, during their professional careers both women had to cope with spending time away from their homes and families. The next two speakers were paired on the basis of similarity of interest (i.e., human health), but had chosen very different careers to satisfy that interest. In common, both had two professional parents, continued their education uninterrupted until they achieved their most advanced degree, and both had children at a relatively early point in their careers.

There was a short break following the second group of speakers: participants were invited to have coffee, introduce themselves to their neighbors, and stretch their legs.

The last three speakers were introduced as a group: they all worked for large corporations; they all recently finished their degrees; and they all were in those disciplines most heavily male-dominated. To keep to the schedule, after these women spoke there was little time for questions from the students.

The reactions of all guests and staff to Session I were overwhelmingly positive--it was described as an extremely open, warm, intimate, and moving experience. Students also rated this session highly[1]; their reactions were interesting. Some commented about the "humanness" and "honesty" of the scientists:

- "...very likeable individuals..."; "nice group of people."
- "...human beings alive and fully involved in career and career choices..."
- "I really liked the speakers because they were very frank about the problems they've had with their careers and family. They didn't try to pull a fast one by wrapping up problems in cotton and behaving like they did not exist..."
- "The openness of the speakers and their excitement and concern..."
- "I liked the panelists at the beginning... because they were so revealing..."

Other participants commenting about the first session were favorably impressed with how women manage to achieve their goals:

- "...seeing and hearing the road blocks put in the way of speakers which they found various positive ways to overcome."
- "...very fascinating... the various backgrounds and how each professional achieved her goals."
- "openness... about difficulties they experienced obtaining their goals, and how they changed fields."

Several students were fascinated with how professional women can integrate their lives:

- "Session I was especially enlightening to learn different ways of juggling career and family life... very worthwhile hearing how different women integrated career and family life."

Some participants felt that the session was effective in that it:

- "gave me insights into my own life especially with regard to integrating family and career... also gave me evidence that what I dream of doing is actually possible..."
- "gave me the feeling that I was not trapped into choosing any one career at this point in my life..."

One student found "Session I... too short"; another said it was "rather long, but interesting"; and a third said "there were too few panelists." Three participants felt that the panelists were "not feminist [i.e., militant] enough"--that "they overlooked difficulties

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[1] See, Evaluation and Impact, page 42-48.

[e.g., discrimination, sexual harassment] that we will face." One student noticed that all panelists were (or had been) married, and suggested we "include a single scientist."[1] On the other hand, one said she had not realized before that "men could be so supportive."

Project staff had two general reactions. The first thing that impressed us was how quickly participants adopted the vocabulary we were using: their comments on the Workshop Evaluation Rating Form are replete with "integrating", "lifestyles", "career choice"--words and concepts not noticeable on their applications.

Our second reaction relates to the participants' capacity to project themselves into the future. For example, although all attendees rated Session I highly at the end of the Workshop, their reactions (five months later) to the written autobiographical materials were less positive than their reactions to some of the other materials. Most adults who received the complete set of materials reacted most enthusiastically to the autobiographies. One participant attempted to describe the problem by stating, "it [Session I] would have been of greater value to older girls [sic]--juniors and seniors [who are closer to making marriage and family decisions]." Four other may have been making a similar point when they said that the panelists should have gone into more detail about their fields.

Sessions IIa and IIb

Only one participant mentioned lunch, suggesting that round tables (not rectangular) would facilitate interaction.

Sessions IIa and IIb ran smoothly. With the exception of two participants who requested a change, all others attended the groups to which they had been assigned. Despite the fact that only two attendees asked for a change (which was made), ten others subsequently expressed their dissatisfaction with the procedure. One student told us, "Do not place participants in the sessions, but allow them to choose the one which they would like to attend." Another stated, "I was put into a group... and I had been looking forward to speaking with someone else."

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[1] We became very aware of this during the session and, in a last minute change of plan, modified Session IV so as to include a discussion of the role of males in the panelists' successes.

In general, the criticism dealt largely with the perceived mismatch between the students' interest and the assignment. Seven said such things as, "It didn't apply to me", and

- "I have nothing against Dr. ____. I just think the[se] sessions should be more geared towards what the student is interested in... I think it was a waste of time to go to a session that was not an interest of mine when I could have been at one I would have enjoyed."

At least two participants who did not like one or another of the groups to which they were assigned appreciated them, nevertheless: One student explained "I was somewhat lost in the discussion with the ____, but in spite of my limited background the information was useful."

Six participants felt these sessions were "not long enough"; one felt they were "too long and too general..."; and another suggested "less time with a wider variety of people..." They said such things as:

- "Those sessions should have given us two hours instead of one hour with each scientist."
- "Too limited amount of time spent with each guest speaker... I would like the workshop to last."
- "Insufficient time... Many areas that might have been touched were just touched and not given the chance to be discussed fully. For many questions did arise and barely any were answered..."
- "...there was no chance to talk on a one-to-one basis."

On the other hand, consider the reactions of two participants:

- "...everyone got to express their feelings. We tried to help each other..."
- "Session IIa, IIb, (and III) gave me the opportunity to ask questions and hear other women's ideas."

In reviewing these comments, it is apparent that those who liked these sessions liked them either because they liked the scientist, and/or because they were interested in the subject matter. And those students who expressed reservation were either not interested in the field under discussion or had individual concerns that were at variance with those of the rest of the group: for example, the older participants tended to have different concerns than the more recent high school graduates. Trying to strike a balance, however, in the future we would probably retain the pre-assignment procedure, since it equalized the size of the groups, limited "favoritism," and exposed participants to interactions they

would not necessarily have selected. We would, however, encourage students who were genuinely dissatisfied to ask to be re-assigned.

Another change we would institute would be to supervise more closely the movement of outside guests. We had asked guests not to enter small-group session rooms if the door was closed (assuming that the scientist kept the door closed for her comfort), and to be non-participant observers in those groups they joined. Both requests were disregarded: all seven scientists commented on the fact that "outsiders" participated in the group and, in several instances, non-productively. In one case the scientist was formulating a response to a participant's question when she was interrupted, and the answer supplied; not only did the presenter report that this made her feel foolish and uneasy, but she also said that the answer was inappropriate.

Session III

There were few specific references to Session III, the session in which participants had a choice. Some students mentioned a particular leader or topic:

- "I really liked ____'s session... because she gave me encouragement and a start to find what I'm looking for."
- "The computer wasn't able to supply enough information on my career."
- "I liked the computer bank very much."

Several participants pointed to the fact that they could exercise choice:

- "...because it was more relaxed and I got the option to change to the different session."
- "I enjoyed [Session III] where we could choose the women with whom we could speak."

Several others indicated that Session III was not long enough:

- "I would have liked to move around and tried all the groups, but there was not enuf [sic] time."
- "...more time with _____."
- "not enough time to visit all the workshops."

The leaders of Session III mini-groups reported that they received a great deal of positive feedback during this hour and that there were few problems. Many participants took the opportunity to move from group to group, while others stayed in one place. From what we observed, the structure (i.e., the freedom) of Session III is important, and should be

retained. A two-day workshop would allow sufficient time to accomodate this.

Session IV

A total of 13 participants left (dropped-out) during or before Session IV: six said they had to go to work; three became ill; three went to class; and one left to host her husband's office party. Two of these women cried when they left, and 10 of them took home and completed a Workshop Evaluation Rating Form and mailed it back to us the next day.

Only one attendee mentioned the last session on any of our measures, despite the fact that the project staff was concerned about this session. It was a very short time in which to attempt to discuss husbands and careers, review the Next Steps participants might consider, distribute materials, and say good-bye.

It was very exciting at the end. Participants were exchanging addresses with one another and with the scientists and group leaders. We were informed subsequently that several students contacted the presenters with specific requests ranging from "I would like to hear you speak again" to "I would like to work this summer as an assistant in your laboratory." Very many students stayed to thank us for accepting them into the program. The last participant left 45 minutes after the Workshop ended; several asked for sets of materials for their friends and teachers; and others wanted us to "stay in touch." At least a dozen students asked that we respond to their comments on the Rating form.

Five scientists and two invited guests joined the senior project staff for a celebration dinner. The last guest left at 10:30 p.m., expressing the same reluctance we all felt in having to call it a day. Within the next two days the seven scientists, three leaders, and five students telephoned to tell us it was a wonderful experience.

Post-Workshop Activity

Work on the project did not end with the conclusion of the Workshop.

Project staff organized the unused materials, sending copies to colleagues at other colleges and universities that asked for them. We also responded to inquiries and requests for help from other agencies and

institutions that were considering similar programs for students.

We reviewed the suggestions participants made on the Rating form, and responded to those women who had wanted us to do so.

We also wrote to the liaisons at 41 colleges, thanking them for their help in publicizing the program and recruiting applicants. Letters of appreciation were sent to the guest scientists and the mini-group leaders, and in several instances, to the agencies that employed them.

Final fiscal matters were taken care of. This involved honoraria to the presenters (all of whom told us that the modest fee would be used to pay an assistant, buy needed supplies, or be forwarded to a charitable or women's organization). In addition, arrangements were made to reimburse participants who brought their own lunch.

Letters were sent to 15 college deans, department chairpeople, and registrars at the request of women students. These letters certified that the student had participated in the Workshop. The students that requested letters wanted them for references--part of their educational record--rather than for the purpose of excusing an absence from class.

A Followup Survey was prepared in two versions (one for attendees and one for non-attendees) for administration in May 1978. The mailing was made up in advance, complete with individual I.D. codes and stamped, addressed return envelopes. Finally, under the supervision of the project director, we began the analyses of the data we had collected. The findings are summarized in the following chapter.

As a direct outgrowth of our involvement in this Workshop project, we obtained funding to develop and implement similar programs. In January 1978, the New York State Education Department Grants Administration Unit awarded us a grant to redesign the IT'S MY LIFE! Workshop for high school female seniors.[1] For fiscal year 1979, they refunded us to conduct a four-day workshop series for seniors graduating from high schools in New York City.[2] Although the focus and target population differ significantly from that described herein, the major elements are similar: the emphasis on careers that are non-traditional for women; the use of role models; the balanced large- and small-group activity; and the integration of professional and life-style concerns.

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[1] VEA # 78-30-807.

[2] VEA # 79-30-808 DPS.

We have been asked, moreover, to assist people from other educational institutions to design science career workshops and have spoken to groups and agencies about our experiences. We have maintained contact with the scientists and have been working toward planning educational programs in concert with them. In addition to the professional relationships that were established, many of us have become good friends.

WORKSHOP EVALUATION AND IMPACT

In this chapter we will describe the impact of the Workshop experience on the educational plans, career goals, and self-image of participants; and their reactions to its various components based on the results of four measures--Life Line, pies, the Workshop Evaluation Rating Form, and the Followup Survey. Copies of these instruments are appended.

Life Line

Life Line was administered to all Workshop attendees twice, once during registration (Activity I-#2), and again in Session IV (Activity IV-#2) at the end of the day. As with the pies, this exercise was designed to: provide participants with alternate ways to examine their value systems and structure their decisions; and to provide staff with data concerning immediate effects of the Workshop on participants' plans.

Life Line consisted of five time-lines, each marked in five-year age intervals from 5 to 70. The first line represented education; the second, work in their chosen career. The third life line was to be used for estimating the ages during which they would spend time working at jobs other than that of their career choice; the fourth for ages at which they would marry; and the fifth to denote their age at the birth of children.

A total of 41 women completed both administrations.[1] The analyses are based on these respondents. Participants did not follow the instructions (circle every age you would be in school, in a career, and so on), and as a result, we made several interpretations. For example, if a student circled only one year on the education life line, this was interpreted

[1] 59 participants completed it during Registration and 45 submitted the instrument completed in Session IV.

as the last year they expected to be in school; but when they circled one year on the career life line we accepted it to mean the first year they would work at their chosen career. Because of these ambiguities we probably would not use this measure again.

In general, there were some slight but not significant differences between the two administrations. The greatest difference was in the average number of years participants expected to be in school--25.4 years at the beginning and 26.1 years by the end of the day. Interestingly, in determining the last age these women expected to be in school, we noted a slight decrease from age 34.4 to 33.9 from the first to the second administration. This result, together with other data presented below, suggests that participants foresaw more education but with fewer interruptions.

The career life line also reflected a slight (insignificant) increase in the number of years women expected to be working at their chosen career. At the beginning of the Workshop, participants indicated they would work an average of 31.9 years (until they reached the average age of 58.4); at the end of the Workshop, they estimated that they would work for 33.5 years on the average, or until they attained the age of 59.5.[1]

Although the mean age at which they intend to marry did not change (age 25.6), there was a change in the percentage of women who considered marriage. On the pre-administration, 11.4 percent said that they did not ever intend to marry; at the end of the Workshop, 9.1 percent ruled out marriage. There are several possible explanations: one is that all the scientists were (or had been) married, and participants were aware of this; the second may be that participants began to appreciate the possibility of combining a career and marriage. Similar trends occurred in the "having children" life line. On the pre-measure, 18.2 percent of the participants indicated they would not have children; on the post-measure, 15.9 percent reported they would not have children.

These data suggest that the Workshop fulfilled its objective to provide participants some exposure to how personal and professional lives can be integrated and highlights the dramatic impact role models have.

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[1]The data for the third life line (work at other jobs) was too ambiguous.

Pies Exercise

Each participant was to divide pies (circles) into life activities, in proportion to the activity's importance--the larger the segment, the more important that activity. One pie represented the present; one the future in ten years; and the third, a 20-year future. These three pies were administered during Registration (Activity #I-1) and again in the last session (Activity #IV-1). The directions asked students to consider the following categories of activities: education, career, and family, and to add other categories of importance.

The data from 41 completed sets were analyzed for differences between administrations: change scores (+, -, and 0) for each participant were calculated by subtracting the size (i.e., the number) of segments allotted to an activity in Session IV from that allotted to it earlier in the day (at Registration). In addition, an average score for a category was computed by totalling the number of segments and dividing by the number of participants who included the category.

Table 4, below, summarizes the average scores allotted to education,

Table 4

Pre- and Post Average Score (size of pie segments) Allotted to Education, Career, and Family, Now, Ten Years, and Twenty Years Into the Future

(+ = increased importance; - = decreased importance)

	Category		
Administration	Education	Career	Family
	Present		
Pre (Registration)	4.58	2.67	2.93
Post (Session IV)	5.11	2.47	3.07
Difference (Post-Pre)	+0.53	-0.20	+0.14
	Ten-Year Future		
Pre	2.34	4.67	3.47
Post	2.70	4.72	3.35
Difference	+0.36	+0.05	-0.12
	Twenty-Year Future		
Pre	1.71	4.27	4.18
Post	2.13	5.10	3.25
Difference	+0.42	+0.83	-0.93

career, and family at the beginning and end of the day. Looking first at the pie that represents the present, as can be seen in the table, education increased somewhat in importance during the Workshop. In the Ten-Year Future pie, education and career gained in importance, and family showed a slight decrease. The largest pre- to post change occurred when participants were asked to divide the Twenty-Year Future pie: there was a decrease in importance of family, a large increase in career importance, and a modest increase in education. It is apparent that from the beginning to the end of the Workshop education increased in importance--at Present, in 10 years, and 20 years into the future. Career decreased somewhat in importance for the present, but showed a great increase in importance in the most distant (20-year) future.

For many of the participants, especially those recently graduated from high school, "20 years from now" meant retirement; after listening to and meeting with the scientists, however, they apparently began to be more aware that being 20 years older does not imply withering old age. Furthermore, the scientists indicated, both directly and by example, that career development involves continuous education (often informal) and participants may have begun to appreciate that pursuit of a scientific career does indeed entail ongoing "learning."

Workshop Evaluation Rating Form

Findings from the Workshop Evaluation Rating Form, which participants completed in the last session (or mailed to us subsequently), reaffirm results previously described. Fifty-six of the 59 attendees completed this form, on which we asked about their plans and had them rate selected Workshop components.

Participants' plans. The Workshop attempted to present participants with new options and ways in which others made career decisions so that they have a basis for evaluating their own goals. Approximately 70 percent (69.6%) of the participants said (in response to Question 14)

that the Workshop made them "more sure" of their career plans; 23.2 percent felt they were "neither more nor less sure" of their career plans; and three participants (5.4%) said they were "less sure" as a result of the Workshop.[1]

We asked participants (Question 2) whether, "as a result of... Workshop activities" they changed their minds about or decided on a college major, minor, and career goal. Their responses are summarized in Table 5. In terms of immediate impact, it is apparent that most

Table 5

Percentage of Respondents Indicating the Status of their Plans As a Result of the Workshop

(Figures in Percentages)

Were Plans Changed?	College Major	College Minor	Career Goal
No	75.0	60.7	66.1
Yes	23.2	25.0	26.8
Possibly	1.8	1.8	1.8
No response	-	12.5	5.3
TOTAL (N=56)	100.0%	100.0%	100.0%

[1] There was one non-respondent.

(60 to 75%) respondents would make no change in their future plans. Approximately one-quarter of the group, however, indicated a definite or possible change in college major, minor, and/or career goal. Of the 14 attendees who indicated a possible change in career goals, six reported that the Workshop had either confirmed or helped them narrow their plans. Another six women explained that the Workshop had expanded their goals: one of these said that she changed from an interest in medical lab technology to an interest in psychopharmacology; another from rehabilitation therapy to psychology-counseling; and a third from medical technician to engineer. As one student put it, "Today's Workshop has made me want to go as far as I can go... the sky is not the limit!" The Workshop also had impact on some participants who previously were considering scientific or technical careers: thus, two participants (who stated on their applications that they wanted to be a teacher and an M.D.) said they were now unsure; and another attendee who had considered occupational therapy as a career said that as a result of the Workshop she knew she wanted to be a music teacher.

Of the 14 participants who said the experience caused them to consider a change in major, three indicated that it had confirmed their choice and three other women decided between two choices. The remaining eight students stated the following changes: from chemical analysis to computer science; nutrition to biology; natural science to physical science; and from pharmacy to pharmacology. And two women decided that a science major was not for them--the music teacher cited above, and a biology major who said she was going to major in English.

Similar trends obtained for the 15 students who said the Workshop helped them with their college minor. Four women who had no minor or who were undecided stated that they would minor in psychology, biology, art, and math. Three participants noted they were "less decided about a minor," but as one put it, "I decided to take a wide variety of subjects then decide. Every course is helpful... " The remaining eight indicated they would change from, for example, English to psychology, and from art to computer science.

Although relatively few women said they would change their college course of study, the Workshop had a very strong influence on the amount of education participants intended to obtain. Table 6 (on the following page) summarizes the responses of the attendees when asked at the end of the day

to "indicate the highest academic degree you thought you would obtain before today and... the highest level... as a result of what you did and heard today" (Question 5). Inspection of Table 6 shows a dramatic

Table 6

End-of-Workshop Ratings of How Much Education Attendees Thought They Would Obtain At the Start and At the End of the Workshop

Amount of Education	At the Start		At the End	
	N	Percent	N	Percent
Four-Year degree	14	25.0	1	1.8
Master's degree	20	35.7	10	17.9
Doctorate (or professional)	20	35.7	27	60.7
Postdoctorate	1	1.8	8	14.3
Doctorate & professional degree	1	1.8	3	5.3
	56	100.0%	56	100.0%

shift toward more education: whereas 14 women (25.0%) said that at the start of the Workshop they intended to obtain a bachelor's degree, all but one said that at the end they would continue their education toward a more advanced degree; similarly, many of those that had intended to end with a master's degree indicated they would go on for more training.

Participants' Overall Workshop Ratings. Using a three-point scale ("very", "somewhat", and "not very"),participants were asked how worthwhile the Workshop was, and why. Fifty of the 56 respondents (89%) rated the Workshop as "very worthwhile"; four women (7%) felt it was "somewhat worthwhile"; and one women rated it "not very worthwhile", explaining that as a psychology major she felt there was inadequate coverage of social and clinical psychology.[1]

The 55 respondents offered a total of 77 statements to explain their rating. Almost all statements were positive. The four negative reactions included the criticism advanced by the psychology major and the following: "It did not answer my specific question"; "It was not feminist enough"; and "with improvement, future participants could leave in [sic] a decision." One woman commented that although she was still confused, "It's my own head."

[1]There was one non-respondent.

The three most frequently given reasons for why the Workshop was very worthwhile had to do with increased information--learning more about the sciences, fields within science, and the necessary training; sharing--that "women are not alone"--they share concerns in common; and decision-making. Responses in these three categories accounted for approximately 60 percent of the explanations. Comments such as "I got interested in...", "It increased my awareness of options", and "I got a good idea of what an actual work day is like" were typically used to describe the experience in terms of information. One comment referred to the "wealth of materials offered" and another student said she learned more than she would have by going to the class she cut.

We were surprised by the nature of comments relating to shared experiences: "I'm not alone", "a career person can have two lives instead of one", "realization of what other women do", "realized that resources and advice are available from women", and "realized women's interests are as wide as opportunity" were some of the more poignant remarks.

About 20 percent of the comments had to do with direction and decision-making. The women responded with: "I learned self-evaluation", "I was helped to decide how I feel about my future", "I am now more realistic", "it intensified my desire for a science career", and "it helped me discover the real me."

Participants also felt that the Workshop was worthwhile in terms of motivation ("it increased my ambition", "proved my ideas/dreams to be possible/practical", and "showed that everything can work if you really want it to"); excitment ("I had been discouraged with my work load, but am now excited about the future"); and confidence ("it increased my confidence to challenge the unfamiliar.")

To summarize: with one exception, all participants rated the Workshop as "somewhat worthwhile" (4) or "very worthwhile" (50). Their reasons had to do with increased knowledge, and information about the self, other women, and the world of science careers; the opportunity to meet and share problems with other peers and professionals; and help and guidance with decisions. They said that they became more realistic, excited, confident, insightful, and "futuristic." Several thanked us, gave us their names and addresses(and took ours) so we could "keep in touch", and wished we would do the Workshop again--for them and for other women.

Ratings of Specific Components and Objectives. The Workshop Evaluation Rating Form included a question asking participants to rate how useful they found each different Workshop session. Table 7, below, summarizes the number and proportion of participants rating the sessions not very, somewhat, or very useful. An average score was computed; the higher the score, the more positive the rating. (Note that the instructions for rating Session III ask the participant to rate only those mini-groups she attended. During this hour, 20 participants continued conversations with scientists, and 17 discussed career choice. Far fewer, 10, 12, and 7 students were involved with the computer, graduate schools, and corporate need groups, respectively.[1] As can be seen, Session I was most useful, followed by the choice mini-group and the continued conversations with the scientists. Least useful were the computer and corporate needs mini-groups.

Table 7

Participants' Ratings of the Usefulness of the Workshop Sessions

Workshop Sessions	Not Very Useful		Somewhat Useful		Very Useful		NR + NA[a]		Average Score[b]
	N	%	N	%	N	%	N	%	
I	0	-	12	21.4	43	76.8	1	1.8	2.78
IIa	4	7.1	14	25.0	34	60.8	4	7.1	2.58
IIb	9	16.1	18	32.1	24	42.9	5	8.9	2.29
IIa + b	13	11.6	32	28.6	58	51.8	9	8.0	2.44
III(Overall)	-	-	-	-	-	-	-	-	2.58
computer	2	3.6	4	7.1	4	7.1	46	82.2	2.20
grad. schools	1	1.8	2	3.6	9	16.1	44	78.5	2.66
choice	2	3.6	1	1.8	14	25.0	39	69.6	2.71
corporate needs	0	-	5	8.9	2	3.6	49	87.5	2.28
scientists	2	3.6	2	3.6	16	28.6	36	64.2	2.70
IV	1	1.8	12	21.4	12	21.4	31	55.4	2.44

[a]No Responses plus Not Applicable (i.e., NA = participants who did not attend a specific session).

[b]The average score was computed using only those participants who rated the session. A rating of 1.00 = not very useful; 2.00= somewhat useful; 3.00= very useful.

[1]Since students attended more than one Session III group the total exceeds the total number of participants.

Question 6 (Workshop Evaluation Rating Form) asked the respondents to use a 3-point scale to describe how helpful the Workshop was in meeting its objectives: (a) acquiring more information about scientific careers they were interested in, (b) learning about careers or occupations that they had not considered before, (c) meeting and talking with women scientists, (d) considering different ways to integrate a career and a personal life, (e) learning about what some scientists actually do on the job, (f) learning about the training necessary for some careers in science, (g) learning about their own likes, interests, skills, and values, (h) encouraging them to consider a scientific career, (i) meeting other colleges' students with interests and concerns similar to theirs, and (j) motivating them to expand their career horizons.

Table 8 (on the following page) presents participants' ratings. Again, the higher the rating the more helpful the Workshop. Included in the table are the number and proportion of students who rated each objective and the average score for the objective. It is obvious that "meeting/talking" to scientists (c) was most helpful, followed by expanding horizons (d), and integrating career and personal life (d). Slightly more than 60 percent of the women felt the Workshop was very helpful in encouraging them to consider a scientific career (average score, 2.59). Relatively less helpful, despite the fact that from 50 to almost 60 percent of the women rated each as "very helpful", were: learning about the training necessary for careers (f), acquiring more information about specific careers (a), and learning about new careers they had not considered (b). The Workshop was relatively least helpful when it came to learning about their own selves and in promoting interaction among students (average score = 2.38)--with half the attendees indicating it was "not very" or only "somewhat helpful" in these regards.

We asked participants to briefly describe what they liked best about the Workshop and why; and what they liked least about the Workshop, and why.[1] For the group, there was a total of 63 scorable "liked least" responses, and twice as many--a total of 125--scorable "liked best" comments.

What participants liked least. Of the 63 responses, 21 percent were to the effect that there was nothing they liked least; and two other comments referred to the fact that any problem encountered was

[1] Questions 7 and 8 on the Workshop Evaluation Rating Form.

Table 8

Participants' Ratings of the Helpfulness of the Workshop in Achieving Selected Objectives

Workshop Objectives	Not Very Helpful		Somewhat Helpful		Very Helpful		NR		Average Score[a]
	N	%	N	%	N	%	N	%	
(a) Acquiring more information about careers	5	8.9	21	37.5	29	51.8	1	1.8	2.44
(b) Learning about new careers	7	12.5	14	25.0	33	58.9	2	3.6	2.43
(c) Meeting/talking to scientists	0	-	4	7.1	50	89.3	2	3.6	2.93
(d) Integrating career & personal life	2	3.6	12	21.4	42	75.0	0	-	2.71
(e) What scientists do on the job	1	1.8	25	44.6	29	51.8	1	1.8	2.51
(f) Learning about training	5	8.9	19	33.9	31	55.4	1	1.8	2.47
(g) Learning about self	7	12.5	20	35.7	28	50.0	1	1.8	2.38
(h) Encouraging consideration of a scientific career	2	3.6	18	32.1	34	60.7	2	3.6	2.59
(i) Meeting other students	5	8.9	24	42.9	26	46.4	1	1.8	2.38
(j) Expanding horizons	3	5.3	8	14.3	45	80.4	0	-	2.75

[a]The average score was computed using only respondents to each item. A rating of 1.00= not very helpful; 2.00= somewhat helpful; 3.00= very helpful.

due entirely to their own problems at the time. There were 14 comments (22%) related to "time", 11 of which indicated that, in general, there was not enough time to do all they wanted to do; three comments indicated that Sessions I and IIb were too long.

Approximately 24 percent (15) of the comments can be categorized as "not enough information." There were four comments about not receiving

enough specific information about specific careers ; four that related to lack of sufficient information about salaries and educational requirements; and one referring to the paucity of literature. Six comments concerned unmet specific needs--"I wanted to talk to..." a bio-medical engineer, a sociologist, a pediatrician, a physician's assistant, and so on.

The next most frequently commented on aspect of the Workshop, accounting for 7 (11%) of the comments, concerned the pre-assignment of participants to Sessions IIa and IIb. "I was placed in an uninteresting group , or "the session was unrelated to my field" were typical.

There were five comments about the Workshop not being personalized enough. For example, one participant (herself a night school student) said there should be a "workshop for students who work and go to school at night." Another said "my questions were unanswered", and a third elaborated on this by stating that the afternoon sessions were "overpowered by the interests of a few students."

The remaining seven responses to "what I liked least" included three who stated that the ideology was not feminist enough; a complaint that we did not "visit workplaces"; and another indicating that "round lunch tables" would have been better. One student was upset by "the small number of women who showed up as compared to the large number who have just gone into the field and do not know everything."

What participants liked best. Participants were very verbal about what they liked. Of the 129 comments made, 68, or 53 percent were related to meeting the guest presenters--21 were specific references to being exposed to other women who have made decisions and faced obstacles that participants identified with. Participants felt they were not alone. As one student put it, "I met women who made decisions I had been worrying myself over and see that they coped so maybe I can too." There were 12 comments about three specific presenters, and 11 about meeting women who were helpful, answered questions, were concerned and who volunteered themselves for future contacts. One attendee said, "I was impressed by how other women are interested in helping." Other things participants liked about the presenters included, "hearing women talk about their lives... " and "meeting women doing things I only read

about." In addition, there were statements about coming into contact with good role models (9), and about meeting nice, likeable people (7). And one participant said that what she liked best was that she came away from the conference with "an increased respect for women."

There were 15 comments about specific sessions and activities Workshop's organization and ambiance, and the small-group interactions. Twelve other comments mentioned information, including learning about what was involved in specific careers and the relationship between education and careers. One young woman stated, "...so many different areas in the science field that I thought were non-existent... I need now to talk to a college advisor and narrow down the choices open to me." The remaining 41 comments also concerned personal growth and development and included 16 statements about expanded options and horizons, five about learning to think ("made me open my mind", "made me think about my career choice and take my life seriously"), and eight about acquiring confidence, strength, and decision-making ability. As one participant said, "Two weeks ago I was in a jag. Today, because of this workshop and a visit to a career counselor at school things are clearer to me... I knew I had to sit down... evaluate... and decide, but I didn't know how to go about it. Now I have a much better idea. Thank you!"

Followup Survey

In May 1978 one version of a Followup Survey was sent to the 59 women who attended the Workshop and another version went to those 51 who were invited but did not show up.[1] Excluding the two questionnaires that were returned by the post office and the two that were too late to include in the analyses[2], completed Surveys were received from 29 attendees and 22 non-attendees; this is a rate of return of 50 and 44 percent of each group, respectively. The high return rate for the latter group suggests a high level of interest and supports their claim that the primary reason for non-attendance was a response to last minute demands on them.

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[1] See Appendix B5 and B8 for copies.

[2] One late reutrn and one undeliverable Survey was an attendee; the other late return and undeliverable mail was for a non-attendee.

The purpose of the followup was to ascertain the extent and durability of change and the nature of activity that occurred subsequent to the Workshop, using the non-attendee group for comparison. We were also interested in how participants viewed the experience five months after the event and their reaction to the materials we provided.

Educational plans. The educational goals and plans of both groups of respondents differed from their plans as specified on the application. Approximately 70 percent (69.0%) of the attendees said that the Workshop "directly influenced" their plans for schooling and 37.9 percent said it directly influenced their major field of study.

More specifically, although all respondents indicated that they planned to continue in college (in September 1978), 13.8 percent of the participants and 9.1 percent of the non-attendees said they would transfer to another institution. When asked why, they explained "to further my education"[1], for "academic reasons", and because their present college did not offer programs in their new fields of interest.

Both versions of the Survey asked students whether they had changed major between September 1977 and June 1978 (Question 2), and whether this was a result of the Workshop (Question 16, participants' survey.) Approximately 14 percent of the non-attendees and 31 percent of the attendees said they had changed major (all of whom attributed it to the Workshop; see Table 11, page 57), and an additional five attendees and one non-attendee indicated an intention to change major next year, i.e., as of September 1978.

The attendee group made the following changes: three changed to a major in biology from medical technology, math, and speech pathology; one changed from pre-med to English; another from natural to computer science; one from anthropology to sociology; and one from bio-medical science to engineering. Those participants intending to change major were to change to liberal arts, biochemistry, nursing, chemistry, and law. They changed major because: "I gained confidence in my abilities"; "I became more certain of what courses to take"; "I realized I was

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[1] Furthering education was most frequently advanced by those who were transferring from a two- to a four-year college.

interested in chemistry"; and "I wanted the more flexibility."

The non-attendees changed (or stated an intention to change) from biology to environmental science, from pre-med to pre-law, and to either chemistry or biology "alone" [i.e., not have a dual major].

Although greater proportions of participants changed their field of study, relatively more non-attendees said they had registered for Spring semester courses (credit and non-credit) that they had not previously considered: 40.9 percent of the non-attendees and 17.2 percent of the attendees reported doing so. Non-attendees registered for courses in writing, Black women, philosophy, nutrition, anthropology, computer science, and math; for Workshop participants, "new" courses included psychology, pharmacology, CPR, business law, and Chaucer.

The comparisons between the groups are most dramatic with respect to the amount of education they wanted. We asked both groups of women whether, between September 1977 and June 1978, they changed their minds about how much education they intended to obtain (Question 5) and to indicate the highest degree they currently sought (Question 4). We also asked if they planned to continue their education without interruption and, if not, to describe the nature and timing of the interruptions (Question 7).

Thirty-one percent of the participants and 13.6 percent of the non-attendees said they intended to obtain more education than they had considered prior to this year. (The remainder of both groups indicated no change in the amount of education they anticipated.) The participants' explanations of "why" included the following: "a master's doesn't seem sufficient"; "a higher degree would be a great asset in my work"; "better career opportunities"; "I can get a better job"; "no one wants someone with only a B.S. in biology"; and, "I want to go as far as I can." Non-attendees said: "times will be changing"; "my friends will get a master's and so will I"; "for more money and a more rewarding career"; and "my field is constantly expanding."

Attendees and non-attendees were asked at three separate times about the highest degree they intended to attain. Their responses on the Workshop Application form, Workshop Evaluation Rating Form, and the Followup Survey have been presented in Table 1, page 9. As can be seen in the table, there were changes in the educational aspirations of

both groups over time. Initially (at the time of the application), approximately one-third of each group said they intended to get a doctorate: a somewhat greater proportion of non-attendees than attendees wanted a master's degree; and relatively more attendees planned on a professional degree and/or a doctorate and a professional degree.

By May 1978,the pattern changed considerably: the greatest proportion of non-attendees continued to aspire to a master's degree, but the proportion who stated a doctorate as a goal decreased by approximately half. This was offset by a great increase in professional degrees. For participants, however, the largest number said they intended to attain a doctorate and although there was also an increased proportion stating they intended to pursue a professional degree, there was a decrease from approximately 34 to 14 percent in those who desired a master's level education.

The immediate impact of the Workshop on the participant group was to greatly increase educational aspirations. This is apparent by comparing the Workshop Evaluation Rating Form responses with the responses on the application. (See columns 1 and 3 Table 1, page 9). At the conclusion of the Workshop more than half the respondents (57.1%) wanted a doctorate and an additional 23.2 percent said they would get a professional degree (3.6%) and/or a doctorate and professional degree (19.6%).

The dramatic surge in desire for more education did not remain at as high a pitch, although at the time of the followup, participants tended to want more education than they had previously. From the data in Table 1 the most stable and dramatic change appears to be in the subset of the attendee group who wanted to complete their education with a master's degree. The long-term effects on this group are especially compelling in comparison with the increase in the non-attendee group who indicated they intended to get a master's degree.

With the increase in the number of years of additional schooling required for more advanced degrees, it is interesting to note that most participants said they anticipated being able to complete their highest degree without interruption: 75.9 percent of the attendees indicated, on the Survey, they would do so, as compared with approximately 80 percent who, on the application, planned to finish their education

without interruption. A smaller percentage, 59.1 percent, of the non-attendees responding to the Survey said they planned to go to school without breaks. For both groups, those that anticipated discontinuity in schooling explained that it would take place between degrees and for the purpose of gaining work experience.

Career goals. The long-range career plans, similar to the educational plans, changed from the time of the application (September-November 1977) to the time of the followup (May 1978). The change was most pronounced for participants, many of whom attributed the change to the Workshop; others indicated that the Workshop served to affirm their goals. Only two non-attendees (9.1%) indicated a change in career (from business to nutrition and from pre-law to pre-med) and both explained that the new choice "was more for me."

There were ten attendees (34.5% of the respondents to the Survey) who mentioned new career goals: nursing rather than forensic medicine; biology rather than teacher of the deaf; and communications rather than pre-med. Other changes were from medical technology to public health; engineering to management;teaching to research; engineering to physics; medicine to chemistry; and medical research to computer systems engineering. Reasons for these changes included an interest in the biology (i.e., physiology) of hearing; the fact that their original choice was too demanding or required too much time in the field; and increased ambition. One participant who changed from medical research to computer systems engineering attributed it to the enthusiasm of the women she met at the Workshop.

Extracurricular activities. We also asked attendees and non-attendees to indicate by a "yes" or "no" response (Question 11, Followup Survey) whether they had engaged in selected extra- and curricular-related activities between January and May 1978. The responses of both groups are summarized in Table 9, page 53; a "percent difference" was calculated, where a "+" indicates a greater proportion of participants who engaged in an activity on their own.

Larger proportions of non-attendees engaged in 13 of the 21 activities listed than did Workshop participants. Participants in greater proportions did the following: read college catalogs--more were transferring and/or considering additional education; read about professional

Table 9

The Proportion of Respondents to the Followup Survey Indicating "Yes" They Had Engaged in Selected Activities Between January and June 1978

(Figures in percentages)

Categories of Activities	Participants % "Yes"[a]	Non-Attendees % "Yes"[a]	Percent Difference[b]
Read college catalogs	79.3	72.7	+ 6.6
Read about science/scientists	79.3	81.8	- 2.5
Read about career women	65.6	40.9	+24.7
Read biographies of scientists	24.2	36.4	-12.2
Read biographies of women	34.5	31.8	+ 2.7
Read about employment of scientists	48.3	77.3	-29.0
Read scientific journals	62.1	72.7	-10.6
Read want-ads	41.4	59.1	-17.7
Joined a science club	31.0	81.8	-50.8
Tried to get a part-time job	41.4	36.4	+ 5.0
Tried to get a summer job	41.4	31.8	+ 9.6
Joined a professional association	24.1	9.1	+15.0
Attended a scientific meeting	27.6	31.8	- 4.2
Enrolled in more math courses	24.1	27.3	- 3.2
Enrolled in more science courses	62.1	59.1	+ 3.0
Talked with school counselors	44.8	81.8	-37.0
Talked with science faculty	69.0	81.8	-12.8
Talked to faculty advisors	58.6	72.7	-14.1
Talked with financial aid staff	44.8	54.6	- 9.8
Talked with college admissions staff	31.0	36.4	- 5.4
Talked to employed scientists	55.2	54.6	+ 0.6
Told people about the Workshop	89.7	N.A.	--
Heard about the Workshop from others	N.A.	13.6	--

[a] Percentages are based on the number of respondents in each group answering Question 11 on the Followup Survey.

[b] A "+"=larger proportion of attendees; a "-"= larger proportion of non-attendees.

women's careers; read biographies of women; tried to get a part-time job; tried to get a summer job; joined a professional association; enrolled in more science courses.

Substantially more non-attendees than attendees joined a science club; talked with college counselors; read employment projections for scientists; read the classified want-ads; talked with faculty advisors; talked with science faculty; read biographies of scientists; and read scientific journals. The two groups differed least with respect to talking to employed scientists; reading about science/scientists; and reading biographies about women. Assuming that the groups started fairly similarly, apparently participation in the Workshop fulfilled the needs of attendees for certain kinds of information--that can be gotten from college faculty, advisors, and counselors--and stimulated them to seek out more professional, adult, and relevant work experience in their fields of interest.

The following two sections on Workshop Materials and the Workshop in Retrospect are based on the responses of 29 of the 59 participants--those attendees who responded to the Followup Survey.

Workshop materials. Written reactions of respondents who had attended the Workshop were our only estimate of the quality and impact of the materials we prepared for participants. We asked participants (Question 17, Followup Survey) to indicate how helpful they found the materials based on a three-point scale of helpfulness. Their reactions are presented in Table 10 (on the following page); included in the table is an average score where the higher the score (i.e., the closer to 3.00) the more helpful were the materials. Also included are the proportions of respondents indicating they "haven't read it yet."

It is obvious that a substantial proportion of respondents had not yet read any of the suggested books (materials that were not included in their sets) and a relatively large percentage (20.7%) had not gone through the "Guide to Self-Directed Career Planning." On the other hand, all had apparently read the scientists' autobiographies and most had read the other materials as well.

Table 10

Proportion of Attendees Completing the Survey Who Rated the Helpfulness of the Workshop Materials

(Figures in Percentages; N = 29)

Materials	Ratings of Helpfulness			Haven't Read It Yet	Average[a] Score
	Not Helpful	Somewhat Helpful	Very Helpful		
Autobiographies	17.2	48.3	34.5	--	2.17
Typical days...	13.7	31.3	51.7	3.3	2.39
Facts about Workshop	13.8	34.5	48.3	3.4	2.36
Career Descriptions	--	34.5	62.1	3.4	2.64
Guide to Self-Directed Career Planning	6.9	34.5	37.9	20.7	2.39
Suggested books to read	3.4	34.5	20.7	41.4	2.29

[a]1:00 = not helpful; 3:00 = very helpful

Looking at the Average Score (computed for those that read the materials), the most helpful materials by far were the career descriptions -- the six sets of materials staff wrote about careers in engineering, physical science, psychology, environmental science, life science, and health, medicine, and dentistry. The participants felt that the least helpful materials were the autobiographies--reactions that do not accord with the reactions of our colleagues and other professionals who saw the materials. Participants' ratings, however, substantiate impressions that these young women either do not feel the need to cope with life-style concerns or cannot anticipate potential conflicts in these areas. It may also reflect the fact that participants "heard" the autobiographies during Session I. Nonetheless, the ratings clearly point to a need on the part of participants for very specific realistic information about scientific careers, preparation, future employment, and typical daily activities.

The Workshop in retrospect. On the Survey we asked attendees several additional questions. One thing we were interested in was whether their opinion about the Workshop's value had changed; 82.8 percent said no. For the five who said their opinion had changed, none had become negative--that is, they affirmed the Workshop's value. One student said, "It had great impact. I volunteered at the _____ and am now involved in an experiment." Another said she "found it very worthwhile."

A third "saw it as a source of information... very beneficial [because she] can think about it when talking to people... it's a basis for my questions." (That same participant felt it would be better "with a lot of followup.") Another women explained that she "realized the Workshop was valuable in making me clarify my goals... and seeing options." The fifth commented that it was the "experiential knowledge that there are women in these fields... gave me an increased sense of security with my choice."

When asked, most of the participants (86.2%) said they would attend if the Workshop were to be offered again, and all but one said they would recommend it to a friend. They felt that the most valuable part of the Workshop, looking back, was the opportunity to interact with successful professionals on a one-to-one or small-group basis; a total of 17 respondents described this as the most valuable part of the experience. They said it in various ways, such as meeting different women and hearing about their careers ; talking on a one-to-one basis with professionals; hearing personal successes of women scientists ; and speaking with various professionals in small groups. They also referred positively to the openness of the discussions and the encouragement they received. Two participants felt that sharing ideas and concerns were most valuable; one said that she enjoyed meeting scientists and peers with interests similar to her own. Four participants commented on learning about integrating their lives and careers. Another two said they "learned about new fields which [as a result] made me think realistically." One participant told us that the Workshop was valuable because it "renewed her interest in computers" and another "realized that women were in fields that I only thought men were in."

In terms of what they found least valuable, 14 respondents either did not respond or said "nothing!"; one "didn't remember"; and one said "lunch." Of the 13 remaining participants, five wanted more specifics--three of whom spoke of not getting an opportunity to speak with persons in particular fields and two of whom felt that we did not provide sufficient information about salary and employment. (Other comments referred to the length of Session I, the superfluousness of Session IV, the repetitiveness of and arbitrary groupings for Sessions IIa and IIb, and the evaluation forms.)

Table 11, below, summarizes the responses of participants when we asked them to judge whether the Workshop had a direct influence on their feelings, plans, and activities. Approximately 86 percent of the respondents

Table 11

Proportion of Attendees Responding to the Survey Who Indicated the Workshop Did or Did Not Influence their Plans and Feelings

(Figures in Percentages; N = 29)

Your Plans, Feelings, Goals:	Did the Workshop have a Direct Influence?		
	Yes	No	No Response
Major field of interest	37.9	55.2	6.9
Use of electives	48.3	48.3	3.4
Use of leisure time	48.3	44.8	6.9
Feelings about self	48.3	44.8	6.9
Feelings about science careers	79.3	17.3	3.4
Feelings about women in science	75.9	20.7	3.4
Career goals	58.7	37.9	3.4
Educational plans	69.0	27.6	3.4
View of your future	86.2	13.8	-

felt that the Workshop did have a direct influence on how they viewed their own future, and more than three-quarters, 79.3 percent and 75.9 percent, felt that it influenced their feelings about careers in science and about women in science, respectively. Half or more felt it directly influenced their educational plans and career goals, as well as their use of electives and leisure time and their feelings about themselves. The Workshop had least influence for the fewest number of participants on their major field of interest.

Again, participants were vocal and positive in their comments. There were those that spoke about increased confidence...

- It "gave me the push to want to succeed--not just talk, but feel I can and will."
- "Realized people will help--I'm not alone."
- "Have more confidence in entering science field as a woman--I know I have more choices."
- "Gave me confidence in planning a life as a scientist."

- "I was encouraged to continue my education, not to limit my goals... the future is unlimited."
- "The age of some of the women inspired me to consider graduate school." [This respondent was 32]
- "I realized what a career in science entails and I decided I wanted more community involvement instead."
- "I was encouraged to further my schooling."
- "I realized that majoring in science was not practical [too much education required] in my life plan. I'll major in computers."

Several participants mentioned learning about new careers or the fact that women are involved in careers they had heretofore thought of as "male"...

- "I heard about careers I never knew before and saw women in these professions."
- "I feel more now that science careers for women are uplifting, meaningful, sense of accomplishment."
- "I opened my mind toward women scientists... totally impressed at hearing women talk, have views, problems, pasts and futures for once, instead of men..."

Some described their realization that women can have careers and other life goals...

- "Realized most importantly one can be both a woman and a scientist."
- "Glad to meet women able to manage a science career and raise families."
- "It's possible for women to have a family and a career."

And a few participants modified their future goals and strategies...

- "I changed majors which is delightful, beneficial, but bewildering."
- "Workshop helped narrow my interest to exactly what I wish to accomplish."
- "The workshop impressed me with the importance of computers in science. I plan to take computer courses."
- "I will take computer courses and see where it leads."
- "I now work as a volunteer... and will continue my education for a more stable future."
- "Before I was undetermined [sic] about my goals and abilities. Now I'm volunteering and the workshop made me determined to be a ____."
- "My future plans have a new dimension."
- "I had to modify my career goals to satisfy all my future life plans."
- "I'm now definite about biology."

The reaction that sums it up most compellingly is the following:

> "I feel [the workshop] directly influenced me in the way I feel about myself, careers in science, a woman in science, my career goals, my educational plans, as well as in my view of my own future; because it made me realize the many fields open to me. It made me aware that I was not the only one, or one of a few in the process of choosing a career. Even more important, it showed me that my problems, questions, and decisions were not unique.
>
> "Through this workshop I was assured that a family and a career can be handled at the same time, and that there are ways and people who are ready, willing, and able to help me with the problems I have and will encounter along the way.
>
> "I found the workshop to be a well-planned, well-organized and exceptionally well-carried-out event. The contents of the workshop were effectively presented and response to questions was good.
>
> "I understand that due to the work and costs a workshop like this entails, it is not possible to carry them out more often. But if possible, I would look forward to workshops which would focus on the different branches of the different sciences, i.e., focus on psychology and then deal with the different areas of psychology, etc. It would serve as a good follow-up to the general science workshop. I feel that with the "It's My Life" workshop as an introduction, these more specialized workshops would be of great value.
>
> "I definitely enjoyed myself, appreciated meeting so many interesting people and am looking forward to other programs you sponsor.
>
> "Finally, it provided me with many resources which I know will prove quite helpful to me and other women that I share them with..."

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Overall, the IT'S MY LIFE! Workshop was effective in meeting its objectives and the needs of participants. It provided participants with career information; strategies for career planning; and, most importantly, exposure to professional scientists in an interactive environment which proved to have a lasting impact on students' values, attitudes, and aspirations. The participants, guest presenters and project staff enjoyed the experience and, with some modification, would repeat it.

The one day Workshop took place on December 21, 1977 at the Graduate School and University Center of the City University of New York in New York City. We chose a weekday so as not to exclude religious women and because there were not sufficient funds to rent space on a weekend. The week before Christmas seemed to present the least conflict with the schedule of vacations and classes or examinations in the schools from which we would be recruiting.

Working through faculty liaisons in science departments and departments of counseling and student services at 48 college and university campuses in the greater New York metropolitan area, we designed an application process whose primary goal was to assure a highly motivated group of applicants. The process was successful to the extent that most of the 240 applications we received were from people who had responded to the posters displayed on the campuses or who had heard about the Workshop directly from friends or liaisons.

We selected 110 freshman and sophomore women students that met the criteria of sex, college year, and better than average potential to successfully pursue a scientific career. An invitation to attend was extended to the 110, all but one of whom accepted; however, in the three working days prior to (and including the early morning of) December 21, 20 additional women cancelled. The reason that the one woman declined was because she would not be in the City. Most of the 20 who withdrew (i.e., those for whom we have record of prior notice of cancellation) had to attend class or take an examination that they had not known about when they accepted the offer.

A severe rainstorm on December 21 accounted, in part, for lowered attendance. Of the 89 participants we expected, a total of 59 women--one-third of whom were freshmen and two-thirds of whom were sophomores enrolled at 28 different colleges and universities--attended. Somewhat less than half of the 51 women who did not attend responded to our Followup Survey (a proportion that indicates a very high level of motivation) explaining that they had to attend class (65%), were too sick to travel in the rain (10%), and overslept (10%). Thirteen participants dropped out during the last 45 minute session at the end of the day: six went to work, three went to class, three became ill, and one had a

social engagement.

Most (73%) of the 59 attendees (including the drop-outs) were between the ages of 18 and 30; few (22%) were or had been married; and eight out of 10 had no children. Of those that responded to the question of ethnicity, 69 percent were white and the remainder included black, Oriental , and persons with Spanish surnames. Twenty-two women of the group that had declared a college major planned to major in biology; most of the 59 participants had not yet declared a minor. On the application to the Workshop, the most frequent career choice was medicine, followed by psychology and related fields. Their educational plans tended to accord with their career goals: one-third of the participants aspired to a doctoral degree and another approximately 12 percent to a professional (M.D.) degree. Largely reflecting the fact that they were drawn from two-year as well as four-year colleges, 11.0 percent would complete their education with a bachelor's degree and 33.9 percent with a master's degree. What participants expected from the Workshop was an understanding of job opportunities in science open to women, a chance to meet professional scientists, and guidance in their own career choices.

The Workshop commenced at 8:45 a.m., half an hour after the arrival of the first participant. As they arrived, they were registered, given sets of materials, and asked to complete two exercises designed to provide staff with some baseline indicators and to focus participants on the day's activities.

At 9:15, Session I opened with the moderator introducing the keynote speaker who addressed the assembled group. Immediately following her welcome, the seven scientists--including a polymer chemist, biomedical scientist, comparative psychologist, engineer, physician, computer scientist, and environmental scientist--were presented. They were introduced in pairs, based on dramatic similarities or differences in experiences, background, or approach to their professions. They ranged in age, ethnicity, and current marital status. Some had young children; other adult children. One was childless and the seventh was in the process of considering starting a family. All had obtained the highest degree required in their field.

To obtain these women, we spoke with and invited eleven. The seven scientists that attended were chosen to represent the most common interests

of the 110 students we had invited; they were also those that had the time and interest to devote to preparation, and for the most part, some prior experience in teaching--although all were currently working in a non-academic setting.

After lunch which lasted from noon to 1:00 p.m. (during which participants freely mingled with the guest scientists), each participant was assigned to two consecutive one-hour small-group sessions. The assignments were made in advance by project staff primarily on the basis of participant interest: they would meet in the first small-group session with the scientists whose background and career seemed closest to that of the students; in the next small-group session the student met with another group led by another one of the scientists whose experiences were also--to the extent possible--of interest or potential interest to the student.

The purpose of these two sessions was identical. They were designed to explore in some depth a typical workday in the life of a scientist, emphasizing the different skills, abilities, and activities made use of in the course of a day; comparisons were also made between the responsibilities of the scientists and other people of lesser (or different) academic qualifications with whom they worked. Much of the time of these groups was spent in elaborating on the scientists' attainment of their goals and in responding to participants' concerns with how to maximize the attainment of theirs.

These two small-group sessions were led by the scientists, assisted by other guests and selected members of the project staff. Three additional guests--a CUNY community college career counselor, a Director of Admissions at another CUNY community college, and the Director of Science/Public Affairs of a major industrial organization--were asked to assist in these sessions (because of their experience in small-group dynamics) and to be the leaders of subsequent mini-group activities.

From 3:00 - 4:00 p.m. we scheduled an optional session (III), during which participants could choose from among five alternative activities: they could continue discussion with any or all of the scientists; explore a computer-based college and career information system; discuss admission requirements for graduate schools; investigate opportunities for scientists in business and industry; and/or engage in values clarification activities.

Most participants elected to spend time with more than one of these mini-groups, and most spent some more time with the scientists.

The final session IV was scheduled from 4:00 - 4:45 p.m. The participants were reconvened as a group, the day's activities were summarized, evaluation instruments were completed, and take-home materials were distributed.

In general, the largest proportion of staff time was in the preparation of materials for the participants. In addition to the design of three exercises to provide data for the evaluation (two pre-post administrations of pies and Life Line and an end-of-Workshop Evaluation Rating Form), staff wrote (or edited) written materials and other exercises to be used during the Workshop and prepared additional materials for home use. The materials for use during the Workshop day included several fact sheets about women in the labor force and about women scientists and autobiographies and typical days of the seven guest scientists. For reference, we compiled sets of materials providing detailed information (descriptions, educational requirements, employment projections) about professional and technical level careers in physical science, engineering, psychology, environmental science, life science, and health, medicine, and dentistry. We also developed "A Guide to Self-Directed Career Planning", auto-tutorial activities that take a user through a series of readings and exercises designed to increase self-awareness and structure investigation of the opportunities that exist in the external world, culminating in decision-making and career planning.

In May 1978, five months after the Workshop, we sent a followup questionnaire to 59 attendees and to the group of 51 women who cancelled or did not show up (the non-attendees). Responses were received from approximately half of each group. During this interim, project staff and guest presenters had some contact with the participants. At the request of some students, we sent letters to department chairpeople and faculty advisors describing the participants' experiences. Students, with their consent, kept in touch with several of the scientists from whom they requested (and received) more information, suggestions for summer and/or part-time employment, and leads to other persons who might help them with their individual unique needs.

Collegial response to the Workshop was uniformly positive. Guests and presenters were enthusiastic in their praise. Even the work we asked of them--updating vitae, writing an autobiography and a description of their typical day at work--was appreciated because it provided the excuse many needed to organize themselves and take a retrospective and prospective look at their development. The effort staff expended to insure smooth organization was also highly regarded by the guests and by the participants.

Extensive evaluations were conducted of the Workshop components and of the impact on the student participants, at the Workshop's conclusion and after a followup period. Participants' immediate reactions were favorable: 50 of the 56 respondents rated it "very worthwhile" and an additional four women said it was "somewhat worthwhile"; and, they remained as positive. Five months later, approximately 83 percent of the respondents said they had not changed their minds about its value, and other women said that they had become more positive in retrospect. Somewhat more than 86 percent said they would attend if the Workshop were to be offered again and all but one said she would recommend it to a friend.

Its principal value (based on frequency of response) was in providing information (participants learned about the sciences, fields within the major disciplines, and the kind of training required); facilitating sharing and increasing awareness of the commonness of concern; and teaching decision-making and self-evaluation skills.

The best part of the Workshop was, without question, the use of the scientists and other presenters as role models and group leaders. Both at the end of the day and five months later, participants were extremely outspoken with respect to interacting with high-level, successful professional women who faced obstacles, experienced and resolved conflicts, and who were concerned with helping others. Participants' concern with the helpfulness of the scientists is especially interesting in light of the fact that so many had told us that their plans were supported by other women--school counselors, women friends, and mothers. Related to this may be the fact that in the interval between the end of the Workshop and the Followup Survey participants apparently did not talk to counselors, advisors, or science faculty to the extent that non-attendees did.

There were very few negative reactions to the Workshop, either at its end or subsequently. Most participants said there was nothing they didn't like. The criticisms had to do with not receiving enough specific information (e.g., about some sciences such as sociology; and about salaries and future employment opportunities) and the pre-assignment of students into small-groups.

When participants rated the usefulness of the sessions, their ratings accorded with their overall reactions. Thus, the most useful session was Session I, followed by the mini-group "Select, Don't Settle" and the continued informal discussions with the scientists. Relatively least useful was the mini-group that worked with the computer search system. Also relatively less useful, although rated better than "somewhat" was the group discussing corporate needs--scientists in industry. Session IIa was more useful than Session IIb, probably reflecting the fact that the match between students' interest and the group to which they were assigned was closer in the first of these two sessions.

Similar results were obtained when we asked how helpful the Workshop was in meeting its objectives. According to the participants, it was most effective in (in decreasing order) providing opportunities to meet and talk with scientists; expanding students' horizons; and exposing them to the concept that careers and personal life can be successfully integrated. It was least helpful, although better than "somewhat", in providing time for them to interact with other students or in furthering their understanding ot themselves.

Approximately one quarter or more of the respondents told us that they changed college major, minor, and career goal as a result of the Workshop; and, many of the changes were substantiated in the followup. For example, 31 percent of the participants as compared with 14 percent of the non-attendees changed college major, and approximately 14 percent and 9 percent of both groups, respectively, said they intended to transfer to other institutions to further their education. It should be noted that most participants remained committed to the biological sciences and many continued to want a career in or related to medicine. Many of the changes, however, were toward the direction of the careers of the scientists--a crucial consideration for the future.

In very many instances where there was no change in major or goals participants said that the Workshop had had a direct influence, probably because it confirmed their choice. From approximately 40 percent to 86 percent of the participants who rated the Workshop in retrospect indicated that it influenced their view of their own future, feelings about careers in science, feelings about women in science, feelings about themselves, their own educational plans, and use of electives and leisure time. With reference to leisure time, far more attendees than non-attendees were seeking part-time and summer employment.

The most dramatic and consistent impact of the Workshop was with respect to the amount of education--the highest degree students hoped to attain. In our view, this is one of the more realistic measures of aspiration and stable indicators of eventual attainment of young college students than is the titling of a future career. On the application, one-third of the participants and one-third of the group that was not to attend said they intended to get a doctorate. More attendees than non-attendees planned to obtain a professional degree and/or a doctorate plus a professional degree and fewer aspired to a master's degree.

The immediate effect of the Workshop was an increase in the proportion of participants who said they wanted more education than they had had. This was reflected in the pre- and post-comparisons of the pie and Life Line exercises and on the end of Workshop Evaluation Rating. On that form, 80 percent of the students wanted a Ph.D. or a professional degree and a doctorate.

By May 1978, there was a levelling off, but the largest number of participants continued to indicate that they aspired to the highest level degree in their field of interest. There was, moreover, a large decrease in the proportion of attendees who intended to complete their education at the master's degree level, in marked contrast to the non-attendees. Although the intervening period also witnessed an increased level of educational aspiration among non-attendees, the trend was toward the master's degree.

In the remaining pages we will present some major recommendations. The context in which they should be viewed is, "If we were to respond to

the same 'Guide for Preparation of Proposals' knowing what we do now, we..."

• would repeat IT'S MY LIFE! with few modifications.

The most significant change we would make is with respect to the choice of date: early Spring would be the optimal time of year. If participants are to be drawn from a number of different colleges and universities with differing class and vacation schedules a weekend conference would present fewest conflicts. However, Saturdays and Sundays present other potential problems including the exclusion of religious students, conflict with social obligations, and--in some instances--unanticipated costs associated with the operation and maintenance of the physical plant on weekends.

We see advantages from drawing together students from several campuses. They represent a range of college populations bringing to the Workshop different experiences, needs, and points of view; they take back to diverse institutions what they gained. They are the best publicizers and disseminators. We might reconsider having students from both two-year and four-year colleges. This difference in goals may encompass more than an additional two years of undergraduate education.

The basic plan for publicizing the Workshop was satisfactory. Posters and flyers displayed on bulletin boards attracted an appropriate population, was relatively inexpensive, and did not promote a situation where there was an overabundance of applicants, the majority of whom would have to be turned down. To the extent practicable, we would enlist the aid of student (rather than staff) liaisons to coordinate publicity and recruitment efforts.

Based on the continued evidence of interest on the part of all our applicants, both participants and non-attendees, we would retain the same application procedure. As a self-screening technique it assured a highly motivated group of women. We would, however, extend invitations to significantly more students than the target number and institute a wait-list to cover cancellations.

It is difficult to speculate whether a two-day conference has more advantages than a one-day one. Obviously, in two days, more and more in-depth work can be accomplished; with two full days we would have increased the opportunity for participants to experience more of the alternatives.

Whether this would have been at the expense of the momentum we generated we do not know. We are certain that the one-day format permitted us to minimize the organizational and administrative concerns and that all persons involved felt an extremely high degree of cohesiveness and excitement.

We do not think it possible (or necessary) to meet all the needs of all the students. There is no way, for example, of making a session or an activity both longer and shorter in duration. Nor, given the real parameters of time and money, can we visualize an approach that gives each student a chance to be with a scientist of her choice, or to get answers to her unique problems. The design of IT'S MY LIFE! can be expanded in an attempt to provide more individualistic responses; in particular, more options could be made available in the choice session (the session which could be enlarged on in a two-day schedule), although our experience indicates that participants preferred to continue conversation with one or another scientist--at the expense of taking advantage of the other alternatives.

Interestingly, we would retain pre-assigning participants into small groups but would more actively encourage those women who were genuinely unhappy to request a change. Despite the fact that pre-assignment was not well-liked there was sufficient evidence that it was not perceived as punitive. This procedure equalizes the size of the small groups and lessened favoritism. Also, relatively few participants found fault with it and even among those that did, several women pointed out that it was valuable just because it was an experience they would not have chosen. Given an approach that learning what one does not like, what one does not want to be, what skills one does not have nor want to acquire is worthwhile--especially if it occurs early enough so that it could be, in time, reviewed again.

The choice of role models and group leaders, in our instance, the the scientists, is critical. Other than recommending that other planners reach out for as accomplished a group of presenters as possible, participants react positively to the young and old, the famous and the newly graduated, the ones most like them and the most different. Participants, however, respond to the sciences (or fields) they represent. The important attributes of effective role models are warmth and genuineness, desire to

help, compassion, and the capacity for remembering that "when I was their age..."

Some of our evidence suggests that college freshmen and sophomores may not be as receptive to discussion to life style as older participants would be: perhaps because they cannot perceive any conflict between personal and career goals; perhaps for this generation there will be less conflict. Nevertheless, the overwhelming weight of the evidence is that such discussion was of crucial importance to most of the participants. We hope that for those that suggested they are not yet ready, we were able to provide an experience they can draw on, should they need to subsequently.

Finally, although the written materials were expensive to produce--both in terms of staff time and duplicating costs--they were very important to the participants. Participants wanted as much information, both written and oral, as they could obtain. Our written materials were designed to provide the scope and depth that could not be provided through speakers, a permanent record of the Workshop, and a collection of materials for future reference. We strongly urge others to devote a great deal of effort to insure that students have sufficient quantities of material to take away with them.

Given the size and total enrollment of the City University of New York, not to mention the other colleges and universities we recruited from, the Workshop had less of an impact on the general practices of the granter institution (CUNY) than it did on CASE (the grantee agency within CUNY) and on the sending colleges. We received and continue to receive requests for copies of our materials, and we respond to questions about how to conduct similar activities. We help other groups with proposals for grants. Much of this activity, we believe, can be attributed to representatives from the sending institutions who sat in on our conference; some of it results from participants' sharing of the experience with faculty and peers at their home school; and some is a direct outgrowth of the contacts and friendships we formed in conducting the Workshop.

Other than on the participants themselves, IT'S MY LIFE! probably had its greatest impact on the project staff and our agency, the Center for Advanced Study in Education/Institute for Research and Development

in Occupational Education. One important by-product is the design of a workshop series for implementation in the 1978-79 school year. Although this series is neither directed at careers in science nor at freshman and sophomore college students, it makes use of many of the materials and techniques that contributed to the success of IT'S MY LIFE! We have, of course, modified them to accord with the needs of a younger group of women and made other revisions to accord with our different objectives.

Although personally and professionally satisfying, our attempts at dissemination (including this report) are not a sufficient response to the duplication of effort and to the other problems we see with repetitive cycles of one or two-day workshops geographically distributed across the country. A more formal mechanism is necessary to insure that the most effective approaches, in whole or in part, are replicated.

The most difficult task facing us in the conduct of this project was decisions concerning the "how-to" of accomplishing our aims: how to publicize, recruit, and select participants; how to identify, select, and train role-models; how to find or develop materials; how to organize the equipment, space, food, transportation; and how to evaluate. The content (the what to) presented relatively less difficulty. We envision that all grantees face similar problems, and that the new cycles of grantees is currently doing so. The experience that each gained should not be lost.

This report was an attempt to share that experience with others. We believe, however, that we could undertake the implementation of another workshop much more easily as a result of IT'S MY LIFE! Our ideal plan, embedded in the statement of the young women we quoted so extensively at the end of the preceding chapter, would be for a Science Workshop series that starts with a general workshop--an adaptation of IT'S MY LIFE!--to serve as an introduction to more specialized workshops, each focusing on a different science.

APPENDIX A

PUBLICITY AND RECRUITMENT

Colleges and Universities Proposed, Contacted, and Represented at the Workshop A1

August 12, 1978 Letter Sent to Directors, Deans, Chairpeople at Colleges and Universities. A2

Poster and Postcard A3

Sample Article for School Paper. A5

Bronx Community College Article A6

Stein College Article A7

CUNY's News Release A8

COLLEGES AND UNIVERSITIES PROPOSED, CONTACTED, AND REPRESENTED AT THE WORKSHOP

SITES PROPOSED:

City University of New York

Bronx Community College*
Eugenio Maria de Hostos Community College*
Fiorello H. LaGuardia Community College*
Kingsborough Community College*
Borough of Manhattan Community College*
Medgar Evers Community College
New York City Community College*
Queensborough Community College*
The Bernard M. Baruch College*
Brooklyn College*
The City College*
Hunter College*
John Jay College of Criminal Justice
Herbert H. Lehman College
Queens College*
College of Staten Island*
York College*

Non-CUNY

Adlephi University
College of New Rochelle
Columbia University (Barnard College)*
Cooper Union
Fordham University*
New York University*
Polytechnic Institute of Brooklyn
Saint John's University
Wagner College
Hofstra University
Long Island University*
Manhattan College*
New School of Social Research
New York Institute of Technology*
Pace College*
Pratt Institute
Sarah Lawrence College*
Stern College (Yeshiva University)*

SITES INITIATING CONTACT:

Suffolk County Community College*
Mount St. Vincent*
Ramapo Community College*
Rutgers University*
New Paltz College - SUNY
Farleigh Dickenson University
Upsula College
Elizabeth Seaton*
Swarthmore College*
Bergen County Community College
Stoneybrook College - SUNY
Vassar College
Trenton State College

*Student representation at Workshop

The Graduate School and University Center
of the City University of New York

Center for Advanced Study in Education
Graduate Center 33 West 42 Street New York, N.Y. 10036

August 22, 1977

The Center for Advanced Study in Education of the Graduate School and University Center of the City University of New York will be conducting a free one-day workshop (under a National Science Foundation grant) on December 21, 1977 on science career opportunities for women. We believe that this workshop will be a valuable experience for freshman or sophomore women with an interest in science who are still planning their career paths. We are enclosing a brief description of the proposed workshop to acquaint you with our objectives and procedures.

Our own publicity efforts will include letters to science department chairpersons at local colleges and universities; flyers and posters on campus; articles in college newspapers and ads in the greater metropolitan area newspapers; and announcements on both college and local radio stations. Women who attend the workshop will be asked to complete an application containing some of the demographic information that NSF requires; and participants will be chosen from among the applicants.

We would like your help in two basic areas: First, we would appreciate your efforts in identifying likely candidates. Second, since the application form should be easily available to interested women, we are asking you to serve as your college's representative and distributor of applications. We can promise to make these tasks as painless as possible.

Within the next four weeks we will be in touch with you for your input and to arrange delivery of application blanks. In the meantime, if you have any questions or reactions, or if you would like any additional information, please call us at (212) 221-3517 or (212) 790-4612.

Thank you very much.

Sincerely yours,

Barbara R. Heller
Project Director

Linda Gross
Project Associate

P.S. If you cannot assume this, or can suggest a more appropriate contact, please call us.

IT'S MY LIFE!

WOMEN IN SCIENCE CAREER WORKSHOP

Supported by the Center for Advanced Study in Education
with a grant from the National Science Foundation

WHO IS IT FOR?

FRESHMAN OR SOPHOMORE WOMEN

interested in the physical, social, or behavioral sciences who would like to:

- explore science career paths and possibilities
- discuss integrating a professional career with personal life styles
- meet and talk with women scientists
- get information about science careers and requirements

WHEN WILL IT BE?

DECEMBER 21, 1977

- all day—lunch will be provided at no charge

WHERE WILL IT BE?

CUNY GRADUATE SCHOOL AND UNIVERSITY CENTER

- 33 West 42nd Street (between 5th and 6th Avenues)
  New York, New York 10036

HOW DO I APPLY?

PICK UP AN APPLICATION ON CAMPUS FROM:

-

- **OR SEND US ONE OF THE ATTACHED POSTCARDS**

- **OR WRITE TO:**

IT'S MY LIFE!
Center for Advanced Study in Education
CUNY Graduate School & University Center
33 West 42nd Street
New York, New York 10036
Room 1430, IRDOE

Stamp

"IT'S MY LIFE!"
Center For Advanced Study in Education
CUNY Graduate School & University Center
33 West 42nd Street
New York, NY 10036

Room 1430
IRDOE

Please send me an application for "IT'S MY LIFE!,
Women in Science Careers Workshop"

NAME _____

ADDRESS _____

_____

I attend _____
(College)

I am a ☐ Freshman, ☐ Sophomore

The Graduate School and University Center
of the City University of New York

Center for Advanced Study in Education
Graduate Center: 33 West 42 Street, New York, N.Y. 10036

MEMORANDUM

To: Editor-in-Chief

From: Center for Advanced Study in Education, City University of New York, IRDOE

Re: Article for inclusion in college newspaper

"IT'S MY LIFE!"

"It's My Life!" is not a new soap. It's the name of a workshop for women from all over the New York area who are interested in science careers. If you are a freshman or sophomore woman intending to major in engineering or in a physical, behavioral, or social science -- or if you think you might consider science as a career -- this may be for you. You'll get to meet women working in the sciences, discuss your own career plans, talk about integrating a career with personal life, and get some information about different scientific fields. And, there's time to chat over a free lunch with women from other colleges with interests similar to your own.

The workshop will be held on December 21, 1977 at the City University of New York's Graduate School and University Center in Manhattan, with joint support from the Center for Advanced Study in Education and the National Science Foundation.

Interested? You can obtain an application for the workshop from your campus representative , or by writing to:

"IT'S MY LIFE!"
Center for Advanced Study in Education
City University of New York
Graduate School and University Center
33 West 42nd Street
New York, New York 10036
Room 1430

Workshop For Women

"It's My life!" is *not* a new soap. It's the name of a workshop for women from all over the New York area who are interested in science careers. If you are a freshman or sophomore woman intending to major in engineering or in a physical, behavioral, or social science — or if you think you might consider science as a career — this may be for you. You'll get to meet women working in the sciences, discuss your own career plans, talk about integrating a career with personal life, and get some information about different scientific fields. And, there's time to chat over a free lunch with women from other colleges with interests similar to your own.

The workshop will be held on December 21, 1977 at the City Univeristy of New York's Graduate School and University Center in Manhattan, with joint support from the Center for Advanced Study in Education and the National Science Foundation.

Interested? You can obtain an application for the workshop from your campus representative, Prof. Anita Baskind, Career Library Loew 307, or by writing to: "IT'S MY LIFE!" Center for Advanced Study in Education, City University of New York, Graduate School and University Center, 33 West 42nd Street, New York, New York 10036, Room 1430.

October 27, 1977

ATTENTION SCIENCE MAJORS

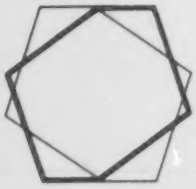
by Erica Smith

Eventually every science major must ask herself, "Can I really make good money dissecting fetal pigs?" The City University of New York has an answer. The Science Career Workshop for Women will be held December 21 and is free of charge.

The goal of the workshop is to plot out a personal career plan for each participant. Most of the workshop is devoted to small activity. Groups of 15 participants will focus on long range career goals and career alternatives, under the leadership of professional scientists. Each participant will have a computer print-out of careers reflecting her interests or abilities. She will also get a personal value balance sheet to aid constructing her individual career decision.

Each woman will also receive information on the job market, both in academic and non-academic science careers. The leaders will show what kinds of opportunities are available at the different life-choice points. They will zero in on promotion, job continuity, advancements, and seniority. Once the career goals have been established, the participants will determine what educational paths to follow.

All women wishing to attend the workshop can pick up an application from ~~Erica Smith~~ in ~~5F~~ 56.



The Graduate School and University Center
of the City University of New York

Office of Publications and Community Relations
Graduate Center: 33 West 42 Street, New York, N.Y. 10036
212/790-4331

FOR COMMUNITY CALENDAR

"IT'S MY LIFE" IS A FREE DAY-LONG WORKSHOP FOR WOMEN FRESHMEN AND SOPHOMORES MAJORING IN OR CONSIDERING A CAREER IN ENGINEERING OR ANY PHYSICAL, BEHAVIORAL OR SOCIAL SCIENCE. -- "IT'S MY LIFE" WILL BE HELD ON DECEMBER 21, AT THE CITY UNIVERSITY GRADUATE CENTER IN MIDTOWN MANHATTAN. FOR MORE INFORMATION ABOUT THIS FREE PROGRAM CALL: 221-3519 or 221-3517.

APPENDIX B

EVALUATION INSTRUMENTS

Workshop Application B1

"Pie" Exercise B2

Life Line Exercise B3

Workshop Evaluation Rating Form. B4

Followup Survey (Participants) B5

Followup Survey (Non-Attendees). B6

CENTER FOR ADVANCED STUDY IN EDUCATION
Graduate School and University Center, City University of New York

WOMEN IN SCIENCE WORKSHOP APPLICATION

"IT'S MY LIFE!"

DECEMBER 21, 1977

Name:_____ Mailing Address:_____

_____

1. When did you (will you) first enter college (indicate month and year)?_____

2. What college will you be attending in the Fall of 1977?_____

3. As of the Fall 1977, what is (will be) your college status? (Check one from each pair):

____full-time student, or ____part-time student
____evening student, or ____day student
____freshman, or ____sophomore

4. How many college credits will you have completed by the end of the Fall 1977 semester?_____

5. Have you declared a college major?

____No; if no, what do you think it might be?_____

____Yes; if yes, what is your declared major?_____

Below, please estimate the degree of likelihood that you will stay in this major:

____very likely; ____somewhat likely; ____not very likely; ____highly unlikely

6. Have you declared a college minor?

____No; if no, what do you think it might be?_____

____Yes; if yes, what is your declared minor?_____

Below, please estimate how likely it is that you will keep this minor:

____very likely; ____somewhat likely; ____not very likely; ____highly unlikely

7. Check the highest level of education you intend to obtain:

____some college, no degree
____two-year college degree
____bachelor's degree
____master's degree
____doctoral degree
____other; please specify_____

Based on current plans, how many years from now will it take you to achieve this?_____

8. At the present time, do you plan to continue your schooling, without interruption, until you complete the highest degree you intend to get? ____Yes; ____No; if no, describe the timing and nature of the anticipated interruption(s): _____

_____

9. After you complete all schooling, what career or occupation do you want to have? (Try to be as specific as possible): _____

How likely do you think it is that you will actually enter this field:

____very likely; ____somewhat likely; ____not very likely; ____highly unlikely

10. Please briefly describe when and how you first became interested in science or scientific careers: _____

_____

_____

11. Do you know anyone who is or was working in a scientific profession? ____No; ____Yes; if yes, please indicate who, including that person's sex, as specifically and anonymously as possible: _____

How has that person influenced your career choice? _____

_____

12. Indicate how supportive each of the following people would be if you entered a scientific career:

	Very Supportive	Somewhat Supportive	Neutral	Not Supportive
Mother	_____	_____	_____	_____
Father	_____	_____	_____	_____
Siblings	_____	_____	_____	_____
Boy Friend(s) or Husband	_____	_____	_____	_____
School Counselor(s)	_____	_____	_____	_____
Girl Friend(s)	_____	_____	_____	_____

13. What is the name (and city) of the high school you were graduated from? _____

_____

What was your overall average? _____ Indicate graduation date: _____

14. Please describe your current (and recent) past hobbies, including clubs or groups (other than social, religious ones) that you belong to: _____

_____

15. List the names of the most advanced science courses you completed:

In high school:	In college (by the end of the Fall 1977 semester):
_____	_____
_____	_____
_____	_____

16. List the names of the most advanced math courses you completed:

In high school:	In college (by the end of the Fall 1977 semester):
_____	_____
_____	_____
_____	_____

17. What career-oriented activities have you participated in during the past year? (Describe, for example, any workshops, seminars, or cooperative-education assignments.) _____

_____

_____

18. Why are you applying for participation in this workshop?_____

_____

_____

19. What do you hope to gain from this workshop?_____

_____

_____

Questions 20 through 26 are optional. Your responses will help in the evaluation, and we assure you that your answers to these and all questions will be kept strictly confidential.

20. What is the year of your birth?_____

21. What is your marital status? ___Single; ___Married; ___Divorced/Separated; ___Engaged

22. To what ethnic group do you belong?

___Black; ___Hispanic; ___Oriental; ___American Indian; ___Other

23. How many children do you have?_____ What are their ages?_____

24. Check the highest level of education your parents attained:

Father		Mother
_____	some high school, no diploma	_____
_____	high school diploma	_____
_____	some college, no degree	_____
_____	bachelor's degree	_____
_____	master's degree	_____
_____	doctoral degree	_____
_____	other; specify_____	_____

25. Does your mother currently work? ____Yes; ____No. Did she ever work? ____Yes; ____No

Describe the type of work your mother does (did):_____

_____

Does your father currently work? ____Yes; ____No. Did he ever work? ____Yes; ____No

Describe the type of work your father does (did):_____

_____

Questions 26-30 are about special requirements you may have related to workshop attendance. Your responses will help us plan the day for you.

26. Lunch will be served. Do you have any dietary restrictions either for health or religi reasons? ____No; ____Yes; if yes, please describe your special needs:_____

_____

27. Will the absence of child care services prohibit you from attending the workshop?

____No; ____Yes; if yes, indicate what type of services would be required, including number and age of children:_____

28. Do you have a physical handicap requiring special arrangements? ____No; ____Yes; if yes please describe your special need:_____

_____

29. Remember that the workshop will be held on Wednesday, December 21, 1977 and will take the entire day. Do you require special permission to be excused from classes?

____No; ____Yes; ____Not Sure

30. Please indicate how or from whom you heard about this workshop:_____

_____

_____

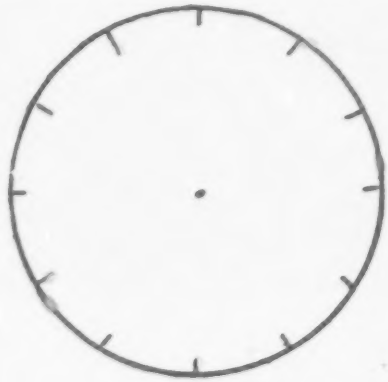
IT'S MY LIFE!

This activity is designed to start you thinking about your life, and the various parts that can comprise it. We are asking you to do this exercise as the first step in career planning.

Below are three circles. Pretend that each circle represents YOUR LIFE at different ages. Life has many parts: education, career, family, and other things. We would like you to divide each circle like pieces of a pie, showing how important education, career, family, and other things are. In dividing the circle, the bigger the piece the more important that part is to you; the smaller the piece the less important. Label each piece to explain what it represents. Be sure to consider other things that are important to you, and label them.

The first circle represents YOUR LIFE at the PRESENT TIME. Divide the pie to show how important EDUCATION, CAREER, FAMILY, AND OTHER THINGS ARE TO YOU NOW. Remember to label all the pieces.

NOW VISUALIZE THE FUTURE TEN YEARS FROM NOW. This circle represents YOUR LIFE IN 10 YEARS. Divide the pie into pieces -- the bigger the piece, the more important -- and LABEL all the pieces.



PRETEND IT IS 20 YEARS FROM NOW. Consider how old you will be, and divide the circle to show how important you think EDUCATION, CAREER, FAMILY, AND OTHER THINGS WILL BE TO YOU. Be sure to label all the parts.

When you finish, detach the yellow copy which we will collect to use as one way of assessing the Workshop.

LIFE LINES

In dividing the pies you considered only one factor -- the relative importance of the pieces. Investigating the importance of different aspects of our life is a necessary, beginning step in understanding our personal VALUES. Some people consider values one of the most crucial parts of career and life planning: if you understand or can clarify your values -- through examining them -- you can set your own goals and plan the steps you need to take to attain them.

This exercise is designed to highlight areas or points in life when values could conflict, resulting in difficult choices that might be anticipated by better planning and clearer understanding of your own intentions and values.

There are five time lines presented below, with ages marked off in five-year periods from ages 5 to 70. (Each dot in between represents one year.) We are asking you to circle ages at which you intend certain things to happen and the ages at which certain things already happened. After you do this for each time line, draw a line down the page at your present age.

5 . . . . 10 . . . . 15 . . . . 20 . . . . 25 . . . . 30 . . . . 35 . . . . 40 . . . . 45 . . . . 50 . . . . 55 . . . . 60 . . . . 65 70

Circle every age you think you will be (or have been) in school.

5 . . . . 10 . . . . 15 . . . . 20 . . . . 25 . . . . 30 . . . . 35 . . . . 40 . . . . 45 . . . . 50 . . . . 55 . . . . 60 . . . . 65 70

Circle every age you think you will be working in your chosen career.

5 . . . . 10 . . . . 15 . . . . 20 . . . . 25 . . . . 30 . . . . 35 . . . . 40 . . . . 45 . . . . 50 . . . . 55 . . . . 60 . . . . 65 70

Circle every age you think you will work (or have worked) at jobs other than your chosen career (e.g., for financial reasons or experience).

5 . . . . 10 . . . . 15 . . . . 20 . . . . 25 . . . . 30 . . . . 35 . . . . 40 . . . . 45 . . . . 50 . . . . 55 . . . . 60 . . . . 65 70

Circle the age you think you will be (or were) married. If you intend not to marry do not circle an age. If you have been married more than once, circle your age at each marriage.

5 . . . . 10 . . . . 15 . . . . 20 . . . . 25 . . . . 30 . . . . 35 . . . . 40 . . . . 45 . . . . 50 . . . . 55 . . . . 60 . . . . 65 70

Circle the age at which you think you would like to have (or have had) children. Circle your age at the birth of your first child, your age for the second child, and so on. If you intend not to have children, do not circle any age.

When you complete this exercise, detach the yellow copy for us to collect to help assess the Workshop.

CASE-IRDOE
12/21/77
IV-#2-

IT'S MY LIFE! Workshop Evaluation

Now that the day is over, we need to know how you felt about the various things we did so that we, and others, can plan and improve future Workshops.

Please answer all questions honestly. Your individual responses will be anonymous, used only to evaluate today's activities. Your "code number" appears on this form so that we can keep track of which participants completed an evaluation for us. Thank you.

1. We want to know how useful you found each different Workshop session. Circle the number--1, 2, or 3--that best describes your reaction to each of the sessions. (We have included a brief descriptive reminder.)

	NOT VERY USEFUL	SOMEWHAT USEFUL	VERY USEFUL
Session I (the morning, when all scientists described their life and work) . .	1	2	3
Session IIa (the first preassigned information session after lunch)	1	2	3
Session IIb (the second preassigned information session after lunch)	1	2	3
Session III (the open-choice session). Check each you attended and rate its usefulness:			
_____ "Ask the Computer" (Ms. Gross)	1	2	3
_____ "It's not what you take, but when and how you take it" (Prof. Adesman) .	1	2	3
_____ Career Choice, "Select, Don't Settle" (Prof. Baskind)	1	2	3
_____ Corporate Needs and Science Talent (Ms. Odom)	1	2	3
_____ Continued Conversations with Scientists	1	2	3
Session IV (wrap-up; this session)	1	2	3

2. Before today, what was, or what did you think might be:

your college major?_____

your college minor?_____

your career goal when your finished all schooling?_____

3. As a result of today's Workshop activities, did you change your mind about, or decide on:

your college major? No:____ Yes:____; if yes, what will it now be?_____

your college minor? No:____ Yes:____; if yes, what will it now be?_____

your career goal? No:____ Yes:____; if yes, what will it now be?_____

4. Are you more sure or less sure of your career plans as a result of today's Workshop?

I am more sure:_____ I am less sure:_____ I am neither more nor less sure:_____

5. Check to indicate the highest academic degree you thought you would obtain before today, and what you think the highest level might be as a result of what you did and heard today.

BEFORE TODAY (Check one)		AS A RESULT OF TODAY'S ACTIVITIES (Check one)
_____	Two-year college degree	_____
_____	Four-year Bachelor's degree	_____
_____	Master's degree	_____
_____	Ph.D. or Professional degree	_____
_____	Post-doctorate Training	_____
_____	Other (Explain)_____	_____

6. Circle a number that best describes how <u>helpful</u> the Workshop was to you in each of the following ways:

	NOT VERY HELPFUL	SOMEWHAT HELPFUL	VERY HELPFUL
Acquiring more information about scientific career(s) you were interested in	1	2	3
Learning about careers or occupations that you had not considered before	1	2	3
Meeting and talking with women scientists	1	2	3
Considering different ways to integrate a career and a personal life	1	2	3
Learning about what some scientists actually do on the job	1	2	3
Learning about the training necessary for some careers in science	1	2	3
Learning about your own likes, interests, skills, and values	1	2	3
Encouraging you to consider a scientific career	1	2	3
Meeting other college students with interests and concerns similar to yours	1	2	3
Motivating you to expand your career horizons	1	2	3

7. Briefly describe what you <u>liked best</u> about the Workshop, and indicate why:_____

_____

_____

_____

8. Briefly describe what you <u>liked least</u> about the Workshop, and indicate why:_____

_____

_____

_____

9. Overall, how worthwhile would you rate the Workshop? (Please check one and explain why.)

Very worthwhile:_____ Somewhat worthwhile:_____ Not very worthwhile:_____

Why?_____

10. If you would like, use the remainder of the page for general reactions, comments, and/or suggestions for similar workshops in the future.

Center for Advanced Study in Education
Graduate School and University Center
City University of New York

IT'S MY LIFE!, Women in Science Workshop: Followup Survey

1. Next September, will you attend the same college that you are presently attending?

☐ Yes, I will attend the same college.
☐ No; I will attend another college. Which?_____ Why?_____
☐ No; I will not attend any college. Why?_____

2. Did you change your major or field of study between last September (1977) and this June (1978)?

☐ No. What is your major?_____
☐ Yes; I changed from a major in _____ to a major in _____
Why did you change?_____
_____

3. Do you intend to change your major field of study next year?

☐ No ☐ Yes; I intend to change my major to_____

4. Check the highest level of education you intend to obtain:

☐ Some college; no degree
☐ Two-year college degree
☐ Bachelor's degree
☐ Master's degree
☐ Ph.D. (doctorate) degree
☐ Professional degree (e.g., M.D., D.D.S., LL.D.)
☐ Other; specify:_____

5. Between last September (1977) and this June (1978), did you change your mind about how much education you intend to obtain?

☐ No
☐ Yes; I intend to get more education. Why?_____
☐ Yes; I intend to get less education. Why?_____

6. Based on your current plans, how many years from now will it take you to complete all schooling?
_____

7. At the present time, do you plan to continue your schooling without interruption until you complete the highest degree you want?

☐ Yes ☐ No. Describe the nature of the interruptions and when they might occur:
_____
_____

8. After you complete all schooling, what career or occupation do you plan? (Be as specific as possible.)
_____

9. Has your career goal changed during this year (between September 1977 and June 1978)?

☐ No

☐ Yes; it changed from _____ to _____

What was the change due to? _____

10. In January or February (whenever the Spring semester begins in your college) did you register for any credit or non-credit courses that you had not considered taking previously?

☐ No ☐ Yes; list the course or courses: _____

_____

11. Below is a list of people, books, and other activities that are used in planning educational, career, and personal futures. For each item on the list check "YES" if you have done it on your own since JANUARY 1978. Check "NO" if you have not done it between January and May, or if it was assigned by a professor.

SINCE JANUARY, HAVE YOU....	YES	NO
Read college and/or graduate school catalogs		
Read literature about science or about scientists		
Read accounts of professional women's careers		
Read biographies of scientists		
Read biographies of women		
Read about employment in scientific careers		
Read professional scientific journals		
Read the classified want ads for scientists		
Joined a science-related club		
Tried to get a part-time job in your field of interest		
Tried to get a summer job in your field of interest		
Joined a professional association as a student member		
Attended a scientific convention or meeting		
Increased the number of math courses you will enroll in		
Increased the number of science courses you will enroll in		
Talked to your college career counselor or placement advisor		
Talked to science department chairpeople or science professors		
Talked to your faculty advisor		
Talked with your college's financial aid advisor		
Talked to college admissions people		
Talked to professionals in your field of interest		
Told people about the IT'S MY LIFE! Workshop		

12. What do you plan to do this summer? _____

_____

13. Looking back at the Workshop, what, in your opinion, was the most valuable and least valuable thing you got out of it?

Most Valuable: _____

Least Valuable: _____

14. In general, since the time the Workshop took place, has your opinion about its value changed?

☐ No ☐ Yes; please explain: _____

_____

15. If the Workshop were to be offered again, would you want to attend? ☐ No ☐ Yes

Would you recommend it to a friend? ☐ No ☐ Yes

16. We want you to judge for us whether you believe the Workshop to have directly influenced:

	YES	NO
Your major field of interest		
The electives you are, or will take		
What you do in your leisure time		
The way you feel about yourself		
The way you feel about careers in science		
The way you feel about women in science		
Your career goal		
Your educational plans		
Your view of your own future		

Please explain any "YES" responses: _____

_____

_____

17. At the Workshop you received a packet of written materials. For each item on the list below, please indicate your reaction to these materials.

	Haven't read it yet	It was not helpful	It was somewhat helpful	It was very helpful
the "autobiographies" of scientists				
the "typical days" in the life of scientists				
facts about working				
the 7 sets of descriptions about science fields				
the Guide to Self-Directed Career Planning				
suggested books to read				

18. If you would like us to write a letter to a professor, department chairperson, or someone else describing your participation in the IT'S MY LIFE! Workshop, please give us the person's name, title, and address: _____

_____

_____

19. If you wish, use the back of this page to describe any general reactions or make any suggestions for other Workshops for women like yourself.

Center for Advanced Study in Education
Graduate School and University Center
City University of New York

IT'S MY LIFE!, Women in Science Workshop: Followup Survey

1. Next September, will you attend the same college that you are presently attending?

☐ Yes, I will attend the same college.
☐ No; I will attend another college. Which?_____ Why?_____
☐ No; I will not attend any college. Why?_____

2. Did you change your major or field of study between last September (1977) and this June (1978)?

☐ No. What is your major?_____
☐ Yes; I changed from a major in _____ to a major in _____
Why did you change?_____
_____

3. Do you intend to change your major field of study next year?

☐ No ☐ Yes; I intend to change my major to_____

4. Check the highest level of education you intend to obtain:

☐ Some college; no degree
☐ Two-year college degree
☐ Bachelor's degree
☐ Master's degree
☐ Ph.D. (doctorate) degree
☐ Professional degree (e.g., M.D., D.D.S., LL.D.)
☐ Other; specify:_____

5. Between last September (1977) and this June (1978), did you change your mind about how much education you intend to obtain?

☐ No
☐ Yes; I intend to get more education. Why?_____
☐ Yes; I intend to get less education. Why?_____

6. Based on your current plans, how many years from now will it take you to complete all schooling?
_____

7. At the present time, do you plan to continue your schooling without interruption until you complete the highest degree you want?

☐ Yes ☐ No. Describe the nature of the interruptions and when they might occur:
_____
_____

8. After you complete all schooling, what career or occupation do you plan? (Be as specific as possible.)
_____

9. Has your career goal changed during this year (between September 1977 and June 1978)?

☐ No

☐ Yes; it changed from _____ to _____

What was the change due to? _____

10. In January or February (whenever the Spring semester begins in your college) did you register for any credit or non-credit courses that you had not considered taking previously?

☐ No ☐ Yes; list the course or courses: _____

_____

11. Below is a list of people, books, and other activities that are used in planning educational, career, and personal futures. For each item on the list check "YES" if you have done it on your own since JANUARY 1978. Check "NO" if you have not done it between January and May, or if it was assigned by a professor.

SINCE JANUARY, HAVE YOU....

	YES	NO
Read college and/or graduate school catalogs		
Read literature about science or about scientists		
Read accounts of professional women's careers		
Read biographies of scientists		
Read biographies of women		
Read about employment in scientific careers		
Read professional scientific journals		
Read the classified want ads for scientists		
Joined a science-related club		
Tried to get a part-time job in your field of interest		
Tried to get a summer job in your field of interest		
Joined a professional association as a student member		
Attended a scientific convention or meeting		
Increased the number of math courses you will enroll in		
Increased the number of science courses you will enroll in		
Talked to your college career counselor or placement advisor		
Talked to science department chairpeople or science professors		
Talked to your faculty advisor		
Talked with your college's financial aid advisor		
Talked to college admissions people		
Talked to professionals in your field of interest		
Heard about the IT'S MY LIFE! Workshop from women who attended		

12. What do you plan to do this summer? _____

_____

13. Please tell us why you were unable to attend the IT'S MY LIFE! Workshop. Be as open as possible, since your reasons will help us and others plan better for the future.

_____

_____

14. If you wish, use the back of this page to describe any general reactions or make any suggestions for other Workshops for women like yourself.

APPENDIX C

SELECTED EXERCISES FOR PARTICIPANTS

Activity I-#3	It's Their Life	C1
Activity II-#1	A Typical Day With A_____	C2
Activity II-#2	Selected SKILLS, APTITUDES, and ABILITIES for a career as _____.	C3

A TYPICAL DAY WITH A _____
(Name of science/scientist)

QUICKLY READ THROUGH THE CATEGORIES LISTED BELOW

No job in science, or in other fields for that matter, consists of only one activity or task (nor does it ever make use of only one type of skill or aptitude). This worksheet is designed for your own use -- to help you abstract the various components of a job while listening to people describing their work. This may help you better match the demands of a career with your own interests and abilities.

As you listen you can check each task or activity you hear discussed, and as many times as it is mentioned. If you start at the left and check towards the right you will have a gauge -- a thermometer -- of the relative importance of an activity in a particular job. The number of scales you check also provides an indication of the diversity of activities and conditions.

TEACHING (formal and informal)

SUPERVISING (giving directions or instructions)

ADVISING (counseling, prescribing)

MEETING WITH COLLEAGUES (working as a team member)

READING (professional journals, reports)

PLANNING WORK (for the next day; for the future)

WRITING (technical reports, proposals for projects)

ADMINISTRATIVE PAPERWORK (forms, budgets)

MAINTAINING TOOLS, INSTRUMENTS, ANIMALS (cleaning, feeding, fixing)

COLLECTING DATA FROM (OR EXPERIMENTING WITH) ANIMALS, PEOPLE

COLLECTING DATA USING INSTRUMENTS, MACHINES

ANALYZING DATA OR RESULTS (checking, interpreting)

WORKING WITH NUMBERS, STATISTICS (calculating)

FORMULATING NEW IDEAS

WORKING WITH COMPUTERS

WORKING UNDER PRESSURE

INFLUENCING POLICY

WORKING LONG HOURS (more than 7-8 hours a day)

WORKING EARLY MORNINGS, WEEKENDS, LATE HOURS

WORKING IN VARIED SETTINGS (labs, offices, plant, field)

READING (professional journals, reports)

PLANNING WORK (for the next day; for the future)

WRITING (technical reports, proposals for projects)

ADMINISTRATIVE PAPERWORK (forms, budgets)

MAINTAINING TOOLS, INSTRUMENTS, ANIMALS (cleaning, feeding, fixing)

COLLECTING DATA FROM (OR EXPERIMENTING WITH) ANIMALS, PEOPLE

COLLECTING DATA USING INSTRUMENTS, MACHINES

ANALYZING DATA OR RESULTS (checking, interpreting)

WORKING WITH NUMBERS, STATISTICS (calculating)

FORMULATING NEW IDEAS

WORKING WITH COMPUTERS

WORKING UNDER PRESSURE

INFLUENCING POLICY

WORKING LONG HOURS (more than 7-8 hours a day)

WORKING EARLY MORNINGS, WEEKENDS, LATE HOURS

WORKING IN VARIED SETTINGS (labs, offices, plant, field)

USING KNOWLEDGE OF MANY SCIENCES

WORKING ON MORE THAN ONE PROJECT

SOLVING PROBLEMS (on a daily basis)

_____

_____

_____

IT'S THEIR LIFE!

This Worksheet is designed for your own use and will not be collected. Feel free to use it for notes, to remind yourself of questions to ask and things to discuss, or for doodling! You may choose not to use it at all.

It is intended to help you organize your thinking about your own educational and career plans, and the kinds of decisions and situations you might encounter on the way toward achieving your goals. As you listen to the scientists this morning, consider the questions on the left below. Add your own. Keep in mind the similarities and differences among the scientists. How does your future relate to their career and life experiences?

CONSIDER...	Lucille C. Gunning, M.D., D.P.M.R. Physician	Marta Kindya, B.S. Engineer	Julie Landstein, M.S., Ph.D.'78 Computer Scientist	Jean Ryniker, Ph.D., Environmental Scientist	Judith E. Sutherland, Ph.D., Polymer Scientist	Ethel Tobach, Ph.D. Comparative Psychologist	Betty Zimmerberg, Ph.D. Biomedical Scientist
• How did she begin to recognize her interest in a science career?							
• At what stage in her life did she begin to consider a science career?							
• What were the factors that influenced her choice?							
• Did she change her career goals as she progressed? From what to what?							
• Were there interruptions in her pursuit of her goals?							
Can you describe the reason for or the nature of the interruptions?							
In your opinion, were the interruptions beneficial?							
• At what stages in her life did interruptions occur?							
Did she have any "control" over their timing or duration?							
• What were the subject areas or things she was good at?							
Are these the same as the subjects or things she was interested in?							
• For how many years did she go to school?							
• Do you sense that she likes her work?							
Which aspects of her work does she seem to like?							
Which aspects of her work seem to provide less satisfaction to her?							
• What people or factors provided her support and encouragement?							
• Who or what were the disruptive or negative influences?							
• Has she been able to cope with being a scientist and a woman?							
• What do you find <u>most</u> attractive about her career and life?							
• What do you find <u>least</u> attractive about her career and life?							
• Can you imagine yourself as one of these scientists?							
•							

Selected SKILLS, APTITUDES, and ABILITIES for a career as _____
(Name of Science)

This worksheet is designed for your own use. By stimulating your thinking about scientific (and other) careers in relation to the particular skills, aptitudes, and abilities needed, it is intended to help you assess your own abilities as they may relate to your choice of career.

You have just completed discussing tasks and activities in a scientist's typical day at work. The next step is to identify the underlying skills and to begin to consider their importance. Complete this worksheet at any time (you may have to finish on your own), by checking the boxes that most closely describe the importance of the skills listed at the left below. (To complete this on your own, refer to Activity II-#1 -- your estimate of tasks and activities, the scientist's "Typical Day" narrative, and her own ratings.)

SELECTED SKILLS, APTITUDES, ABILITIES	HOW IMPORTANT?			
	Very	Quite	A Little	Not At All
WRITTEN COMMUNICATION (ability to write clearly and convincingly)				
ORAL COMMUNICATION (ability to speak/explain ideas or activities to others)				
READING (ability to read quickly and with comprehension)				
ARITHMETIC APTITUDE (add, subtract, divide and multiply -- accurately)				
MATHEMATICAL APTITUDE (understand higher mathematics--algebra, calculus, probability theory)				
SPATIAL COMPREHENSION (comprehend forms in space & pictorial representations of them -- e.g., blueprints)				
FORM PERCEPTION (picking out slight detail -- shapes & shading -- in objects, pictures)				
CLERICAL PERCEPTION (picking out details in printed materials -- as in proofreading)				
MANUAL DEXTERITY (using hands to work with objects skillfully and easily)				
EYE-HAND-FOOT COORDINATION (moving hands & feet in coordination, to react to what is seen)				
COLOR DISCRIMINATION (detecting similarities or differences in colors or shades of color)				
HUMAN RELATIONS (getting along with many people; understanding others' problems)				
CREATIVITY & IMAGINATION (dealing with abstract ideas; devising new solutions or theories)				
ORGANIZATIONAL SKILL (ability to plan or work out tasks or problems in terms of timing, sequence, & skills that are required)				
SUPERVISORY SKILL (ability to assign or explain tasks to other persons)				
PATIENCE (ability to wait or to repeat the same activity as often as needed to achieve the desired outcome)				
PHYSICAL STAMINA (withstand long days, irregular hours, or unusual conditions--temperature, dirt)				
PHYSICAL STRENGTH (ability to lift and/or carry up to 25 pounds)				